

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY
JUAN DUARTE, BETSY DUARTE
and N.D., Infant, by Parents
and Natural Guardians JUAN
DUARTE and BETSY NOBLES, On
Behalf of Themselves and
All Others Similarly Situated,

Plaintiffs,

vs. No. 2:17-cv-01624-ES-SCM

UNITED STATES METALS
REFINING COMPANY; FREEPORT
MINERALS CORPORATION and
AMAX REALTY DEVELOPMENT, INC.,

Defendants.

VIDEOTAPED DEPOSITION OF GEORGE FLOWERS, Ph.D.,
taken at 4 Gateway Center,
Newark, New Jersey, at 8:52 a.m.,
Friday, June 14, 2019, before Robin
LaFemina, a Registered Professional
Reporter, Certified LiveNote Reporter and
Notary Public.

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5 Exhibit 563 Letter report by 265
6 Susan Litherland
7 dated June 21,
8 2018, bearing Bates
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1 **THE VIDEOGRAPHER:** Good morning.
2 This is the video operator speaking,
3 Eric Lenz, of Worldwide Court Reporters.
4 Today is Friday, June 14, 2019. The
5 time is approximately 8:52 in the
6 morning. We are at the offices of
7 McCarter English, 4 Gateway Center,
8 Newark, New Jersey, for the video
9 deposition of Dr. George Flowers in the
10 matter of Duarte, et al. versus U.S.
11 Metals Refining Company, et al. This
12 is in the U.S. District Court, District
13 of New Jersey, matter number
14 2:17-CV-01624.

15 Counsel, please introduce
16 yourselves.

17 **MR. SUTHERLAND:** Lewis Sutherland
18 for defendants.

19 **MR. GERMAN:** Steven German for
20 the plaintiffs.

21 **MR. GADOURY:** Chris Gadoury for
22 the plaintiffs.

23 **THE VIDEOGRAPHER:** And will our
24 court reporter, Robin LaFemina --

25 **MR. SUTHERLAND:** Hold on. Do we

1 want to get who's on the phone?

2 **THE VIDEOGRAPHER:** I beg your
3 pardon.

4 **MR. NIDEL:** Chris Nidel by
5 telephone for the plaintiffs.

6 **MR. RUBENSTEIN:** Joel Rubenstein
7 by telephone.

8 **MR. GERMAN:** For the plaintiffs.

9 **THE VIDEOGRAPHER:** Okay.

10 And will our court reporter,
11 Robin LaFemina, please swear the
12 witness.

13 GEORGE FLOWERS, Ph.D.,
14 called as a Witness, having been first
15 duly sworn by Robin LaFemina, a Notary
16 Public within and for the State of New
17 York, was examined and testified as
18 follows:

19 EXAMINATION BY

20 **MR. SUTHERLAND:**

21 Q. Dr. Flowers, you've had your
22 deposition taken a number of times before;
23 correct?

24 A. Yes.

25 Q. And so I'm not going to go over

1 all the rules and everything, but you
2 understand that the testimony you give today
3 is under oath; correct?

4 A. Yes.

5 Q. And you understand that I am --
6 my name is Lewis Sutherland and I represent
7 the defendants in the litigation where you
8 are providing expert testimony for the
9 plaintiffs; correct?

10 A. Yes.

11 Q. And if at any point in time
12 today you don't understand a question that
13 I'm asking you, I would ask that you tell me
14 that so I can clarify the question.

15 Is that okay with you?

16 A. Yes.

17 Q. And if you answer the question
18 that I've asked, I'm going to assume that
19 you've understood the question, at least to
20 the best of your ability; correct?

21 MR. GERMAN: Objection.

22 A. Yes.

23 Q. And, again, if at any point in
24 time you need to take a break, that's fine
25 with me, just let me know, I may finish up

1 the question that I'm working on, but this
2 is not an endurance contest and we can take
3 a break whenever you need to.

4 Okay?

5 A. Yes.

6 Q. I hand you a document that I've
7 marked as Exhibit 542.

8 (Exhibit 542, Notice of
9 Deposition of George Flowers, marked
10 for identification, as of this date.)

11 Q. Do you recognize that document?

12 A. Yes, I do.

13 Q. And have you seen it before?

14 A. Yes, I have.

15 Q. And if I just direct your
16 attention to the last page of Exhibit 542,
17 there's a request for documents.

18 Do you see that?

19 A. Yes.

20 Q. And the counsel for the
21 plaintiffs provided me with a link yesterday
22 afternoon that included a number of files,
23 your GIS files, your data files, your
24 reference files and some deposition
25 transcripts.

1 Are those documents that you
2 prepared in response to this request for
3 documents?

4 A. Yes.

5 Q. And those links and the
6 documents contained within those links, is
7 that -- do those represent a complete set of
8 documents that you relied on in connection
9 with the preparation of your report in this
10 case?

11 A. Yes.

12 Q. Is there anything else other
13 than those documents that you relied on that
14 you can think of as you sit here right now?

15 A. No.

16 Q. And if at any point in time
17 during the deposition you remember that
18 there was something else that you're relying
19 on, then you'll tell me that; right?

20 A. Yes.

21 Q. What did you do to get ready for
22 your deposition today?

23 A. I read my report, I read
24 deposition transcripts for Dr. Blum,
25 Dr. Singh, Dr. Rosenfeld and Dr. Sullivan,

1 and that's about it.

2 Q. How much time did you spend
3 reading those deposition transcripts
4 approximately?

5 A. Probably 20 hours. I didn't
6 keep track exactly.

7 Q. Was there anything in those
8 deposition transcripts, the testimony by
9 those witnesses, that, as you sit here right
10 now, that you can remember that you disagreed
11 with?

12 A. I -- no. I think -- there's so
13 much information in the transcripts, a
14 specific question would be helpful.

15 Q. Okay.

16 But as you sit here, there's
17 nothing that jumps out at you right now that
18 says, oh, my goodness, I don't agree with
19 that?

20 A. I have some different opinions
21 about certain aspects in them, but they're
22 so specific that, you know, I would like a
23 question about them.

24 Q. Okay.

25 A. You know. So when we -- as we

1 get into discussing things, those depositions
2 may come up.

3 **Q.** **Okay.**

4 **Let me go -- and --**

5 A. The one exception I would make
6 is I did note in Sullivan's deposition that
7 he mentioned an input error to his air model.
8 That's not a disagreement in his conclusion --
9 with his conclusions as much as it's just a
10 fact that's in the deposition.

11 **Q.** **And that error that Mr. Sullivan**
12 **made in his air model resulted in an overall**
13 **estimation of the historic emissions from**
14 **the USMR facility; correct?**

15 A. I don't know. I would reserve
16 judgment until I see the revised air model.

17 **Q.** **Okay.**

18 **And to the extent that your**
19 **report relies on the work by Sullivan, are**
20 **you reserving judgment in terms of how his**
21 **revised model may impact your --**

22 **MR. GERMAN:** Objection.

23 **Q.** **-- own conclusions here?**

24 **MR. GERMAN:** Objection. Form
25 and foundation. You may answer.

1 **THE WITNESS:** Okay.

2 A. I'm not relying on his
3 quantitative results. I'm looking at the
4 configuration of the plume, the fact that
5 the plume, according to the model, went out
6 over the class area. So I'll wait until he
7 revised the model and then reevaluate it.

8 **Q.** So if I understand your
9 testimony correctly, you are not relying on
10 the air modeling predictions as far as the
11 quantity of metals that were deposited on
12 the soil; is that right?

13 A. Right. I see the model as
14 qualitative.

15 **Q.** And the qualitative information
16 that you're taking from it is essentially
17 the geographic shape of the plume; correct?

18 A. Yes. Where the lobes of
19 deposition are.

20 **Q.** You issued an original report in
21 this case on May 6 of 2019; correct?

22 A. Yes.

23 **Q.** And then you issued a revised
24 report on June 10 of 2019; is that right?

25 A. Yes.

1 Q. You have a copy of the June 10
2 version in front of you; is that right?

3 A. Yes.

4 Q. And I'm happy to mark your copy,
5 I have a copy for you. Do you have a
6 preference on whether or not you want to
7 keep yours?

8 A. I'd rather keep mine --

9 Q. Okay.

10 A. -- clean.

11 Q. All right.

12 Well, let me go ahead and mark
13 Exhibit 543.

14 (Exhibit 543, revised expert
15 report of George C. Flowers, Ph.D., P.G.,
16 marked for identification, as of this
17 date.)

18 MR. GERMAN: That's clean;
19 right?

20 THE WITNESS: Yes.

21 Q. And I'll hand this to you.

22 A. Okay.

23 Q. And if you could identify
24 Exhibit 543 for the record, please.

25 A. Exhibit 543 marked 6/14/15

1 [sic], title is USMR Smelter Impact on
2 Carteret, New Jersey Residential Soils,
3 Revised Report Submitted to German &
4 Rubenstein, LLP June 10, 2019 by George C.
5 Flowers.

6 Q. And does Exhibit 543 contain the
7 opinions that you expect to render in this
8 case, at least so far as class certification
9 goes?

10 A. Yes. Subject to revision as
11 other information becomes available, for
12 example, the revision of the air model.

13 Q. Okay.

14 But as of today, it's a complete
15 expression of your opinions?

16 A. Yes.

17 Q. Okay.

18 What are the differences between
19 Exhibit 543 and the original version that
20 you produced on May 6?

21 A. The main difference is inclusion
22 of the final tranche of sample data for the
23 plaintiffs. There were three tranches, one
24 sort of December/January, one March/April
25 and then there was one extending into May,

1 and I didn't have time to include those in
2 the May 6 report. So I included them in
3 this revision. So that's the major change.

4 **Q. Did the May 6 sampling data**
5 **change any of your opinions?**

6 A. No.

7 **Q. It was just more data that you**
8 **wanted to include?**

9 A. Right.

10 **Q. And if you could turn to page 4**
11 **of Exhibit 543 --**

12 A. There were some other changes.

13 **Q. Okay. Well --**

14 A. You know.

15 **Q. -- let's go ahead and finish**
16 **that. What other changes?**

17 A. Because they're just -- they're
18 not substantive and they didn't change any
19 of my opinions.

20 If you go to -- let's see if
21 I can find it -- if you go to point 1 on
22 page 1 --

23 **Q. Mm-hmm.**

24 A. -- at the very end, the last
25 sentence, heavy metal contamination from the

1 USMR's smelter has frequently increased soil
2 loading in the proposed class area that
3 exceed ambient background contamination for
4 all contaminants, that sentence was modified,
5 and it will persist. So I think it's just
6 the clause that exceed ambient background
7 concentrations for all contaminants.

8 **Q. And why did you change that?**

9 A. It was an oversight not
10 including it.

11 **Q. Any other changes?**

12 A. Okay. Let's just go -- hopefully
13 I can remember them all. I corrected, if
14 you can find this hard to believe for a
15 geochemist, I corrected the reactions on
16 page 6, somehow I had some typos in them, so
17 they're balanced now.

18 **Q. Okay.**

19 A. They're just generalized
20 reactions showing smelter processes in a
21 copper smelter. Let's see. If you look at
22 Table 4 on page 16, I had a typo, again,
23 inconsequential, as a percentage in the
24 standard deviations for copper and lead.

25 **Q. Okay.**

1 A. You know, it's in the last two
2 decimal points in a number 4,000 or 3,000.

3 Q. **All right.**

4 **Anything else?**

5 A. I think that's it. To the best
6 of my knowledge at this point.

7 Q. **I noticed one other thing on**
8 **page 21 at the bottom, there's a calculation**
9 **of --**

10 A. Oh, that's right. You're right.

11 Q. **-- of the --**

12 A. There is one more.

13 Q. **-- impact from I guess it's the**
14 **McVehil modeling?**

15 A. Yes. That was an error in the
16 first report. I left out a conversion factor.

17 Q. **Okay.**

18 **So that was just a math error**
19 **that you --**

20 A. It's a math -- well, it's like I
21 forgot to convert from pounds to grams.

22 Q. **Okay.**

23 A. But I fixed it.

24 Q. **Okay.**

25 A. I think that's pretty much it.

1 Q. Okay. All right.

2 If you could turn to page 4 of
3 Exhibit 543 and if you look at the first
4 paragraph under the heading Purpose of Report.

5 Do you see that?

6 A. Yes.

7 Q. And looking at that first
8 sentence and just reading the second part,
9 you were asked to render an expert opinion
10 on whether or not residential soil
11 contamination in the area was caused by
12 releases from the USMR smelter that operated
13 during the period 1906 to 1986 as a primary
14 and secondary copper smelter; is that right?

15 A. That's what it says.

16 Q. And does that accurately
17 summarize what you were asked to do in this
18 case?

19 A. Yes. I was asked to determine
20 whether or not the USMR impacted soils in
21 the class area and to what extent.

22 Q. And is that what you ended up
23 doing?

24 A. Yes.

25 Q. Did you end up doing anything

1 **else besides that?**

2 A. Yes. I was also asked to
3 consider in the process alternate sources of
4 contamination that might be present in the
5 class area.

6 Q. **And did you complete your work**
7 **in terms of an assessment of potential**
8 **alternate sources to your satisfaction?**

9 **MR. GERMAN:** Objection to form.

10 You can answer.

11 A. I did. I concluded that the
12 smelter is the primary source and the other
13 sources are minor compared to the smelter.

14 Q. **And you felt like that you had**
15 **enough data and analytical work and the like**
16 **to reach a conclusion to a reasonable degree**
17 **of scientific certainty that all of the**
18 **alternate sources are minor; is that correct?**

19 **MR. GERMAN:** Objection.

20 A. Yes.

21 **MR. GERMAN:** You can answer.

22 A. Yes. My view was a view looking
23 at possibilities, for example, leaded gas,
24 pesticides, fill, etc., but in a very
25 general way, and comparing them to the mass

1 of contaminants that more than likely would
2 have been delivered from the smelter.

3 That's the approach I took.

4 Q. **And there was no additional data**
5 **or information that you needed in order to**
6 **address that question as part of your**
7 **report; correct?**

8 A. In my opinion, I didn't need any
9 other data.

10 Q. **Okay.**

11 **Dr. Flowers, approximately what**
12 **are your billings to date on this case?**

13 A. I saw this in some of the other
14 depositions. I estimate roughly \$70,000.

15 Q. **And what's your hourly rate?**

16 A. \$350 an hour for general work
17 and \$400 an hour for interrogation.

18 (Exhibit 544, curriculum vitae
19 of George C. Flowers, marked for
20 identification, as of this date.)

21 Q. **I hand you a document that I've**
22 **marked as Exhibit 544.**

23 **Do you recognize that document?**

24 A. Yes. This is the CV that I
25 submit to clients for consulting work.

1 **Q.** **Do you have more than one CV?**

2 **A.** I have an academic CV, which
3 would have all the committees I'm on, all
4 the courses I teach, all the positions I've
5 held within the university, which are
6 mentioned on the front page here also, so
7 it's -- it would be all the grants, all the,
8 you know, the academic side of my life as
9 opposed to the consulting side of my life.

10 **Q.** **And so do you have more than two**
11 **CVs, you've got an academic --**

12 **A.** No. I just have two. I have an
13 academic and I have a consulting CV.

14 **Q.** **Okay.**

15 **And it's correct to say that**
16 **the -- well, let me ask another question**
17 **first. Is Exhibit 544 an up-to-date version**
18 **of your consulting CV?**

19 **A.** Yes.

20 **Q.** **And it includes all the**
21 **employment that you had over the course of**
22 **your career?**

23 **A.** No. Not all of it. It goes
24 back about five years. It says 2014 to
25 present. Those are the cases that I've

1 testified in.

2 Q. Oh, I'm sorry, I meant to say
3 your employment in terms of like not your
4 testifying experience, but --

5 A. Okay.

6 Q. -- but the jobs that you've held.

7 A. But my jobs? Most of my work is
8 in litigation. Occasionally, a very minor
9 amount, I might be asked by an engineering
10 company to identify some strange thing in a
11 box of airplane engines like dust, but I
12 haven't had one of those cases -- too long
13 ago. I'm trying to think, when's the last
14 time I had one of those. I think an
15 engineering company asked me to identify
16 some materials -- they were doing a project
17 with the Japanese where they wanted to know
18 the amount of montmorillonite in soil
19 samples for foundations, and there were
20 competing methods, and so we did a trial
21 where we compared their method to a different
22 method and I gave them my results using the
23 different method and they went off and did
24 whatever the Japanese company decided to do
25 with it.

1 **Q.** And what kind of methods were
2 those? Were those chemical methods or --

3 **A.** Well --

4 **Q.** -- microscopy methods or --

5 **A.** Well, there is a method called
6 the methylene blue method for determining
7 montmorillonite and then you can do an x-ray
8 defraction analysis of the clay and both
9 methods are semi-quantitative, and what you
10 want to do is correlate the mechanical
11 properties of the clay with the composition
12 of the clay, particularly the amount of
13 montmorillonite in it, and then they would
14 do amelioration, they would add, try to
15 stabilize the soil because the soil is in
16 this site what it is, so that's really what
17 they were trying to get at was try to get a
18 better -- higher strength soil in an area
19 that had really bad soil, so they had -- the
20 approach they took was to look at what was
21 the composition of the clay that they had
22 under -- at this site.

23 **Q.** And is it correct to say that as
24 a general matter in geochemistry, source
25 identification like what you were just

1 talking about typically will focus on
2 identifying compositional features, that is,
3 what are the chemicals and compounds that
4 are present, morphological features, I mean,
5 what did the particles look like in terms of
6 their shape, and then the size of the
7 particles, aren't those three things that
8 typically are part of a source identification
9 in geochemistry?

10 A. I wouldn't --

11 **MR. GERMAN:** Objection. You can
12 answer.

13 A. I wouldn't say that they're
14 typical. I would say it really depends on
15 the particular study what you're doing.

16 Q. But in this particular study
17 that you did for the engineering company, at
18 least two of those components were a
19 significant part of it in terms of looking
20 at the morphology and the compositional
21 nature of the samples?

22 A. We didn't look at morphology.
23 We looked at the mineralogy of the sample,
24 and that's the information that we delivered
25 to the company, the relative percent of each

1 constituent.

2 Q. Well --

3 A. We did not look at SEM work, we
4 did not do any of that.

5 Q. Does x-ray defraction give you
6 information about morphology?

7 A. No. I would qualify that with
8 the exception that if you prepare the sample
9 poorly, the x-ray defraction will tell you
10 something about it, you know, for example,
11 you can take some of this rock and you grind
12 it, but you don't grind it well, you'll get
13 a mediocre x-ray defraction pattern. On the
14 other hand, if you grind it thoroughly, you
15 will get an excellent x-ray defraction. So
16 in that sense, indirectly it tells you
17 something, but it does not tell you anything
18 about the unaltered particle.

19 Q. Okay.

20 Other than your consulting work,
21 your career has been spent in academia;
22 correct?

23 A. Yes.

24 Q. You got your advanced degree
25 training at California Berkeley; correct?

1 A. Yes.

2 Q. And then you spent the bulk of
3 your career in academia at Tulane in New
4 Orleans; correct?

5 A. Yes.

6 Q. Now, are you still a professor
7 at Tulane?

8 A. Yes.

9 Q. Okay.

10 Do you have an active class load?

11 A. Yes.

12 Q. Okay.

13 What did you teach this last
14 semester?

15 A. I taught weather and climate and
16 petrology.

17 Q. And what's petrology?

18 A. Petrology is the study of rocks.

19 Q. Okay.

20 A. So we might -- I gave them a
21 piece of this to look at (indicating).

22 Q. And you consider yourself an
23 expert in geochemistry; correct?

24 A. Yes.

25 Q. And you consider yourself an

1 **expert in geology; right?**

2 A. Yes.

3 Q. **Do you consider yourself an**
4 **expert in civil engineering?**

5 A. I have a degree -- master's
6 degree in civil engineering, more focused on
7 soils and foundations rather than bridges,
8 say.

9 Q. **Okay.**

10 A. So I would say I'm a civil and
11 environmental engineer, more toward the
12 environmental side.

13 Q. **And the focus of that engineering**
14 **expertise is on sort of the structures and**
15 **lithology of soils; is that right?**

16 A. Yes. But it's also, because
17 it's an engineering degree, it gets me an
18 entrée into any type of engineering report
19 or discussion or mechanism of -- because
20 engineers have a common curriculum at the
21 base and then they specialize in civil or
22 chemical or whatever, and so it allows me to
23 understand industrial processes, if they're
24 described clearly, to look at plans, but I
25 do not do any creation of plans, like no

1 design work.

2 Q. You don't have a degree in
3 chemical engineering, do you?

4 A. No.

5 Q. And you have never worked in a
6 field where you either designed or operated
7 chemical processing units; correct?

8 A. No.

9 Q. And you don't have a degree in
10 mechanical engineering, do you?

11 A. No.

12 Q. And you never worked in a field
13 where you designed or operated mechanical
14 operating equipment like pumps and heat
15 exchangers and the like?

16 A. No.

17 Q. Are you an expert in
18 environmental freight and transport?

19 A. Yes.

20 Q. And when you talk about
21 environmental freight and transport, does
22 that include expertise in the dispersion and
23 deposition of air emissions?

24 A. It -- like I was saying, the
25 engineering degree, I took courses, I teach

1 meteorology, I teach weather and climate, I
2 teach air pollution, I understand the
3 concepts surrounding those subjects, and
4 that allows me to read reports and understand
5 them, but I would not -- I'm not an air
6 modeler per se, but I can read an air
7 modeling report and understand it.

8 **Q. And you're also not an expert in**
9 **the creation and evaluation of air emission**
10 **estimates, are you?**

11 **MR. GERMAN:** Objection to form.

12 You can answer.

13 A. Um, I'm not sure what you're
14 asking there.

15 **Q. Do you understand the concept of**
16 **an air emissions inventory?**

17 A. Yes.

18 **Q. You can't and you're not an**
19 **expert in the creation of an air emissions**
20 **inventory for an industrial process, are you?**

21 A. If we're talking in very general
22 terms where all the data is available, I'm
23 not an expert in that. The problem in this
24 case is the data isn't available.

25 **Q. But the answer to my question is**

1 **is that's not something that you're an**
2 **expert in?**

3 A. I don't hold myself out as an
4 expert in doing that; no.

5 Q. **Did you look at Mr. Sullivan's**
6 **air emissions inventory in this case?**

7 A. I read his report.

8 Q. **Did you look at any of the**
9 **underlying data that formed his emissions**
10 **inventory?**

11 A. Most of the -- most of the air
12 models that I have seen rely on the EPA
13 estimates of emission rates, emission
14 factors for various industries as opposed to
15 direct measurements. Since the plant in
16 this case doesn't exist anymore, such data,
17 particularly through the historical record,
18 is not available.

19 **MR. SUTHERLAND:** Objection.

20 non responsive.

21 Q. **My question really was: Did you**
22 **look at the basis for Mr. Sullivan's**
23 **emissions inventory in this case?**

24 A. Again, I'm not an air modeler.
25 I read his report and I can understand what

1 he said, but the details of how he generated
2 those figures, I'm not an expert in that.

3 Q. Did you do any due diligence on
4 the details that underlie his analysis?

5 MR. GERMAN: Objection. You can
6 answer.

7 A. Again, I'm not an air modeler.

8 Q. And so the answer to my question
9 is no, you didn't do any due diligence?

10 MR. GERMAN: Objection.

11 A. No, the answer is I am not an
12 air modeler.

13 Q. Are you an expert in source
14 identification of minerals and chemicals in
15 soil?

16 A. Yes.

17 Q. And what, when you're doing that
18 kind of work, what are the tools that you
19 use to do it?

20 A. Well, if you're doing minerals,
21 you have to determine the mineralogy, and
22 I've written papers looking at heavy
23 minerals as an indicator of the source
24 regions of sedimentary rocks, so if you have
25 a course sand, there's a light fraction,

1 there's a heavy fraction. The light
2 fraction is quartz, that doesn't help you,
3 the heavy fraction may be things like
4 tourmaline, staurolite, ilmenite, etc., and
5 by looking at that suite of heavy materials,
6 you can determine something oftentimes about
7 what the source is. For example, in a young
8 sand that's only been eroded and weathered
9 once, the heavy mineral suite will have a
10 lot of unstable heavy minerals in it.
11 However, if it's a multi-cycle sand that's
12 been weathered several times and eroded
13 several times, the suite will only have the
14 most resistant heavy minerals in it. So
15 I've done that type of work where I've
16 looked at mineral speciation and made
17 comments about source regions for
18 sedimentary rock units.

19 **Q. What analytical tools do you use**
20 **to separate out the various types of minerals?**

21 A. Heavy liquids, tetrabromomethane.

22 **Q. So it's a density test?**

23 A. Yes. It's a density test.

24 **Q. Are you an expert in the**
25 **identification of the source of heavy metals**

1 in soil?

2 A. Yes.

3 Q. And by heavy metals, I would
4 include lead. You would agree that that's a
5 heavy metal?

6 A. Sure.

7 Q. What about arsenic? Is arsenic
8 a heavy metal?

9 A. Yes.

10 Q. And so are you an expert in the
11 identification of lead and arsenic in metal,
12 the source of it?

13 A. Yes.

14 Q. And have you done that kind of
15 analysis in other cases before?

16 A. Yes.

17 Q. Did you do that kind of analysis
18 in the Patrick versus First Energy Generation
19 case?

20 A. Let me see. I don't see that
21 one on the list. Who was the -- who was the
22 defendant?

23 Q. First Energy Generation. It
24 was --

25 A. Was that Shipping Port?

1 **Q.** It was a power company in
2 **Pennsylvania.**

3 **A.** Yeah. Shipping Port. That case
4 was a fly ash case, deposition of fly ash
5 and gypsum on residential properties. There
6 were upsets in the plant and it generated
7 white rain and black rain that deposited
8 material from the power plant on residential
9 properties. So in that case, I looked at
10 the particles that were collected with white
11 samples and looked at them with the electron
12 microscope, documented that fly ash was
13 indeed on the properties, gypsum was indeed
14 on the properties, and pretty much that was
15 the extent of what my part of that case was.

16 **Q.** And in identifying the fly ash
17 particles, you used scanning electron
18 microscopy to identify the size of the
19 particles, for example; correct?

20 **A.** Size and chemistry.

21 **Q.** Yes. So you looked at --

22 **A.** And morphology.

23 **Q.** Right. So the big three things
24 that you looked at were are the size of the
25 particles consistent with the air emissions;

1 correct?

2 A. Yes.

3 Q. Is the morphology of the
4 particle, the shape of the particle
5 consistent with the air emissions; correct?

6 A. Yes.

7 Q. And then you looked at what was
8 the chemical composition of the particle
9 consistent with what you would expect from a
10 coal fired power plant; correct?

11 A. Yes.

12 Q. And you also opined in that case
13 that those fly ash particles originating
14 from coal combustion contain arsenic; right?

15 A. Yes.

16 Q. And that arsenic was one of the
17 chemicals of concern with respect to potential
18 contamination of those properties; correct?

19 A. Yes.

20 Q. In looking at the source of
21 heavy metals and soil, have you ever used
22 metal ratios as a technique to evaluate the
23 source of the metal?

24 A. Yes; but my experience is that
25 depending on the nature of the source, it

1 may be helpful, it may not be helpful.

2 **Q. Can you remember a case where**
3 **you did use metal ratios to identify the**
4 **source of heavy metals?**

5 A. I tend to shy away from ratios
6 because they're very difficult to do
7 statistics with, and I don't remember a case
8 where I considered them to be a definitive
9 answer.

10 **Q. And I didn't really ask if they**
11 **were a definitive answer, I just meant where**
12 **you may have used metal ratios as a line of**
13 **evidence in a number of other techniques.**

14 **Do you remember a case like that?**

15 A. No, I don't think I've ever used
16 ratios, but if you -- correct me if I'm wrong.

17 **Q. Okay.**

18 **You didn't use or evaluate metal**
19 **ratios in this case; correct?**

20 A. No.

21 **Q. In terms of evaluation of the**
22 **source of the lead and arsenic in soil, do**
23 **you use geostatistics?**

24 A. No. I did include a diagram
25 that was geostatistical in nature, that

1 would have been the contour map with the --
2 in the AOC.

3 **Q.** **You would agree with me that**
4 **geostatistics are sometimes used as a way to**
5 **identify the source of heavy metals in soil;**
6 **correct?**

7 **A.** Sometimes.

8 **Q.** **And those geostatistics can**
9 **include things like, you know, are you**
10 **familiar with variograms?**

11 **A.** Yeah. Well, let me clarify
12 something. The word geostatistics can have
13 two meanings. One meaning is the application
14 of statistics to the geological sciences.
15 There's another form of definition of it,
16 which is the one you're talking about, where
17 you are using contouring as a mechanism for
18 estimate interpolation, and that's where
19 things like kriging, inverse distance come
20 into play, etc., and the variogram would be
21 part of kriging.

22 **Q.** **Well, thank you for that because**
23 **I think that helps. Let's talk about both**
24 **of those things then.**

25 **A.** Okay.

1 Q. So the broader category of just
2 statistics in this source analysis process,
3 you typically use that as part of the suite
4 of analytical tools in identifying the source
5 of lead and arsenic in soil; correct?

6 A. Right. I would apply statistics
7 through the chemical data.

8 Q. And in this case, you did
9 exactly that with some Spearman correlation
10 coefficients; correct?

11 A. Yes.

12 Q. And there are a number of
13 statistical tools that can be used in a sort
14 of broad definition of what geostatistics
15 might mean; correct?

16 A. Yes.

17 Q. I mean, for example, you
18 mentioned that you prefer the use of
19 Spearman correlation coefficients to the
20 Pearson coefficient because we had a
21 non-normal sample distribution; correct?

22 A. Right.

23 Q. And you can also look at other
24 statistical methodologies like principal
25 component analysis; correct?

1 A. Yes.

2 Q. But you didn't do principal
3 component analysis here --

4 A. No.

5 Q. -- right?

6 A. No. It's kind of redundant with
7 three variables. You don't get a lot.
8 Guess what? The major effect's going to be
9 copper, I can tell you right off the bat.
10 The other two are going to be second and
11 third --

12 Q. Did you --

13 A. -- in terms of eigenvalues.

14 Q. Did you review any of the
15 principal component analysis done by other
16 experts in this case?

17 A. No.

18 Q. You haven't seen it?

19 A. No.

20 Q. Another thing that you can do is
21 you can do trend analyses like the Mann-Kendall
22 test; correct?

23 A. Mann-Kendall, maybe I've got it
24 mixed up, but that seems to be a test that --
25 about normality.

1 Q. That's your recollection as you
2 sit here, that that's --

3 A. Right now.

4 Q. -- a normality test?

5 A. But I may be wrong about that.

6 Mann-Kendall doesn't seem like trend analysis.

7 Q. Okay. Well, you could use
8 statistical trend analysis.

9 A. Oh, yeah, you could fit the data
10 and get a trend line and go to town on it.

11 Q. But you didn't do that here;
12 right?

13 A. No. There's so much variability
14 in this data, that the fit would be mediocre
15 at best.

16 Q. Okay.

17 And you can also do things like
18 other types of forensic chemistry like
19 looking at isotopes and other things like
20 that; correct?

21 A. You could do that.

22 Q. But you haven't done that here?

23 A. No.

24 Q. Are you an expert in environmental
25 site assessment for remediation purposes?

1 A. I am not a remediation expert,
2 but I can take data and determine whether or
3 not it is above screening levels and
4 probably needs to be looked at by a licensed
5 remediation specialist.

6 Q. **But you wouldn't hold yourself**
7 **out as an expert in setting those screening**
8 **levels or clean-up levels; correct?**

9 A. Those levels are set --
10 promulgated by regulatory agencies. They're
11 already out there.

12 Q. **And you would defer to the**
13 **regulatory agencies as to the appropriate**
14 **clean-up level; correct?**

15 A. I would. I would defer to them.
16 But they change their minds.

17 Q. **Fair enough.**

18 **You're not an expert in risk**
19 **assessment, are you?**

20 A. No.

21 Q. **And are you an expert in the New**
22 **Jersey environmental regulations?**

23 A. I have enough experience where I
24 can read those regulations, but I don't have
25 them memorized, I can't quote them to you,

1 etc.

2 Q. Are you rendering any opinions
3 regarding the adequacy of the lead clean-up
4 level that's established under New Jersey
5 regulation?

6 A. The one opinion that I am
7 advancing is simply an observation that
8 clean-up for lead levels are decreasing and
9 New Jersey has employed soil screening
10 levels less than 400, for example, 200. If
11 you go to the West Coast, it might be 80.
12 So there's not unanimity about what the
13 magic level is to clean up lead in soils.

14 Q. But you're not rendering an
15 opinion and don't have an expertise to
16 render an opinion regarding the underlying
17 toxicology and scientific analysis that goes
18 into the debate about where those clean-up
19 levels ought to be?

20 A. No.

21 Q. That's not your --

22 A. I'm not a toxicologist.

23 Q. And so, for example, do you
24 understand that lead clean-up levels are
25 generally set by regulatory agencies and

1 toxicologists based upon a model that's
2 known as the IEUBK model?

3 A. Yes.

4 Q. You're not an expert in what the
5 particular input parameters ought to be in
6 order to run the IEUBK model, are you?

7 A. No.

8 Q. I think you told me earlier that
9 the bulk of your consulting practice is in
10 litigation; correct?

11 A. Yes.

12 Q. And when you say litigation, are
13 you -- do you primarily mean that you're
14 functioning as a testifying expert like you
15 are here in this case today?

16 A. Yes.

17 Q. And is it correct to say that
18 the vast majority of your work as a
19 testifying expert has been testifying on
20 behalf of plaintiffs?

21 A. Yes, that would be true. I do
22 have one case that is for the defense, it's
23 a trip and fall case for the city of Kenner
24 that involves subsidence, and I work for the
25 defense.

1 Q. In your report, you mention a
2 number of other smelters. One of those
3 smelters is the smelter in West Virginia;
4 correct?

5 A. Yes.

6 Q. And were you a testifying expert
7 in litigation related to the Spelter smelter?

8 A. Several times.

9 Q. And what were the nature of your
10 opinions for that litigation?

11 A. That the smelter had contaminated
12 the class area in the Perrine case. The
13 other two cases I cannot talk about because
14 they've been sealed.

15 Q. Okay.

16 The Spelter smelter was a zinc
17 smelter; right?

18 A. Yes.

19 Q. And that's a -- that's a
20 fundamentally different smelting process
21 than a copper smelting; correct?

22 A. I would disagree with that. I
23 think they both fall under extracted
24 metallurgy using a technique called
25 pyrometallurgy that involves reduction of

1 ore minerals to native metal. So in that
2 sense, they're very similar chemically.
3 Different, cross out copper, put zinc.

4 Q. **But the unit operations that you**
5 **go through --**

6 A. Yes. They're different.

7 Q. **And --**

8 A. But the chemical processes are
9 the same.

10 Q. **And the feedstocks are**
11 **fundamentally different; right?**

12 A. Sure. One you're refining zinc,
13 you may be refining zinc as a green ore with
14 sulfur in it, or you may be refining zinc as
15 a calcine where the zinc is bound to oxygen
16 in the form of zincite and that eliminates a
17 step driving off the sulfur, which means
18 that you simply reduce the zinc oxide to
19 zinc metal at a temperature high enough
20 where it is a vapor, and then you condense
21 the zinc vapor to form slab zinc, which is
22 in German the word spelter.

23 Q. **And none of those processes**
24 **occur in a copper smelter, do they?**

25 A. No.

1 **Q. The feedstock in a zinc smelter**
2 **will have different, I don't know if**
3 **contaminant is the right word, but unusable**
4 **materials than the feedstock to a copper**
5 **smelter; correct?**

6 A. I wouldn't say different. I
7 would say related. In certain types of
8 deposits, which are called polymetallic
9 sulfide deposits, all kinds of sulfides can
10 occur together, but generally when you're
11 doing zinc you want to mine the highest tin
12 or ore that you can find, which is a zinc
13 deposit, usually lead zinc deposit, galena
14 sphalerite, and so -- but it also has a lot
15 of other minerals that are present in it
16 that are sulfides, arsenic sulfides, cadmium
17 sulfides, contaminants that occur. So
18 between the two types, a copper and a zinc
19 smelter, the common denominators are lead
20 and zinc -- I mean, not lead and zinc, lead
21 and arsenic. They occur in both types of
22 smelters.

23 **Q. Does arsenic occur in appreciable**
24 **amounts in a secondary copper smelter?**

25 A. Depends what you're feeding the

1 beast.

2 **Q. Are you aware of any feedstock**
3 **for a secondary copper smelter that would**
4 **include appreciable amounts of arsenic?**

5 A. Usually feedstock is not
6 analyzed. There's no data.

7 **Q. So you don't know?**

8 A. There's no data. I don't know.

9 **Q. How long did the Spelter smelter**
10 **operate?**

11 A. I think it opened in 1911 as a
12 primary smelter and then maybe '71 or ish it
13 transitioned to a secondary recycling zinc
14 smelter, made things like cadmium dust and,
15 you know, recycled zinc and like that, so
16 ultimately I think it closed down around --
17 totally around 2000. So 1911 to 2000 in
18 various incarnations. Is that what you say
19 in my report? I have it in there. We can
20 go to it and get dates if you'd like.

21 **Q. You're welcome to consult it if**
22 **you need to.**

23 A. Well, I'm just giving you off
24 the top of my head. It's probably the same
25 general period of time that the Carteret

1 smelter was operating. You know, not all of
2 them started in the 20th century. Some of
3 the -- some of the zinc smelters are even
4 older than that, the late 19th century.

5 Q. **How many smokestacks did the**
6 **smelters in the Spelter smelter have?**

7 A. Let's see. Well, again, in
8 various incarnations, things changed over
9 the years, I remember one or two major stacks.

10 Q. **How tall were they?**

11 A. I don't remember how tall they
12 were.

13 Q. **Did you do any comparison**
14 **between the location of the West Virginia**
15 **zinc smelter and Carteret in terms of**
16 **whether the weather patterns were similar?**

17 A. No. The situation is such that
18 it really wasn't part of my charge.

19 Q. **Okay.**

20 **How -- what was -- what was the**
21 **production out of the zinc smelter in Spelter?**

22 A. At one time, it was -- when it
23 transitioned to a vertical retort from
24 horizontal retort, manually charged retorts
25 to a vertical retort, it was the largest in

1 the country at one time.

2 Q. And do you know how that compares
3 to the production rate of the primary smelting
4 that took place in Carteret?

5 A. No. I didn't compare those two.

6 Q. That wasn't part of your charge?

7 A. No. I didn't compare those two.

8 The reason I -- I -- my purpose in bringing
9 up Spelter and the Rustin was to bring up
10 two pyrometallurgical smelters. Not all
11 smelters use fire to extract metal. Some
12 use electrochemistry to extract metal. And
13 of the different families of smelters you
14 have, the ones that produce the most pollution
15 are the pyrometallurgical smelters.

16 Q. Did you compare the arsenic
17 content of the feedstock to the -- of the
18 smelter, zinc smelter, to the arsenic
19 content of the feedstock in the Carteret
20 smelter when it ran as a primary copper
21 smelter?

22 A. The only indication in Spelter
23 that there was some idea what was in the
24 feedstock was looking at what was called the
25 pile. The pile was slag. And when you

1 analyzed the slag, you found that in the
2 slag, which was one component of the waste,
3 there's all kinds of -- there's fugitives,
4 there's stack emissions, there's all kinds
5 of stuff that goes on, runoff, erosion,
6 etc., but when you looked at that, arsenic
7 was a major contaminant of the feedstock.

8 **Q. Did you compare that data point
9 to any data point in Carteret?**

10 A. I didn't find any data on what
11 the composition of the slag was, you know,
12 in Spelter, the characterization was very,
13 very thorough, thousands of samples, and I
14 felt it was fairly reliable. I found nothing
15 on that order of magnitude for Carteret.

16 **Q. Did you ask for that information
17 for Carteret?**

18 A. I looked at the sampling
19 locations, the map of sampling locations
20 onsite, and I could tell by looking at it
21 that it wasn't anywhere near the density of
22 sampling, I wouldn't think, and it was a
23 little bit different kind of sampling. It
24 was a composite of all the contamination
25 that was on the site. So it would have

1 included fugitives, it would have included
2 stack emissions, it would have included
3 slag, it would have -- anything that would
4 have come down or been moved into or thrown
5 out the door from the smelter. The Spelter
6 smelter, they basically ran the charge
7 through the smelter, zinc was pulled off as
8 product and then this flaming mass of
9 whatever was left was put into a little
10 small mining railroad car, was wheeled out
11 and then dumped on the ground, and they
12 operated that way. So there was this huge
13 pile of spelter waste that could be sampled
14 and analyzed.

15 **Q. And as far as you know, the**
16 **facility in Carteret didn't have a unit**
17 **operation similar to that in its copper**
18 **smelting process; correct?**

19 A. Well, they would have had to
20 clean out the cupola, for example, somehow.

21 **Q. But as far as you know, they**
22 **don't have -- they didn't have anything like**
23 **what was happening at Spelter?**

24 A. I would not say they're one for
25 one exactly the same. They're different --

1 there are differences between spelter sites.

2 Q. And in terms of evaluation of
3 the loadings of arsenic and lead and the
4 other contaminants of concern, you didn't do
5 any sort of quantitative evaluation to
6 compare Spelter to Carteret; correct?

7 A. No. My purpose for including
8 Spelter was demonstrative, that contamination
9 is observed with pyrometallurgical smelters
10 and that that creates a plume and the plume
11 is significant in its geographic extent.

12 Q. The other smelting facility that
13 you refer to in your report is the Asarco
14 smelter in Rustin; correct?

15 A. Yes.

16 Q. And is your sort of purpose in
17 including that report the same as what you
18 just described for Spelter?

19 A. Yes; but it's closer to the
20 Carteret smelter because it's a copper
21 smelter. It didn't start out that way. It
22 started out as a lead one and then they
23 changed the feedstock to a copper feedstock.
24 Even at one time they produced arsenic. You
25 know, most of these, they diversify over

1 time producing different kinds of materials.

2 Q. And the reason or part of the
3 reason why the Rustin smelter produced
4 arsenic was because it had a very high
5 arsenic content in its feedstock; correct?

6 A. If they produced arsenic as a
7 product, one would say that that was probably
8 correct.

9 Q. And did you compare the arsenic
10 content of the feedstock in Rustin to the
11 arsenic content in the feedstock when
12 Carteret ran as a primary copper smelter?

13 A. No. Again, my purpose in
14 including those two was more to get the
15 point across, that pyrometallurgical
16 smelters create large geographic plumes of
17 heavy metal contamination.

18 Q. Did you compare how long the
19 Tacoma smelter or how long the Rustin
20 smelter operated as a primary copper smelter
21 versus how long the USMR smelter operated?

22 A. They're generally, you know,
23 like I said, it started off as lead and then
24 it transitioned to copper and it remained
25 copper all the way through it when it closed,

1 it closed in the 1980s, it began in the early
2 1900s. It's in here. So they overlapped.

3 Q. So is it your testimony that the
4 Rustin copper smelter operated as a primary
5 copper smelter for a similar period to the
6 period that the Carteret USMR facility also
7 operated as a primary copper smelter?

8 A. I wouldn't say that. I would
9 say that their operation was primarily as a
10 copper smelter during their history, and
11 their histories overlapped.

12 Q. Okay.

13 Did you do any kind of
14 quantitative comparison in terms of the
15 total production in terms of the amount of
16 production from Rustin versus the amount of
17 production --

18 A. No, I didn't.

19 Q. Did you do any comparison
20 between how many stacks and how tall the
21 stacks were comparing Rustin to the USMR
22 facility?

23 A. I did make one note that the
24 Rustin stack was at one time the highest in
25 the world, over 500 feet, but other than

1 that, no.

2 **Q. Did you make any comparison**
3 **between the meteorology around the Rustin**
4 **smelter as compared to the meteorology**
5 **around the USMR facility?**

6 A. No. Again, my purpose was to
7 document the fact that smelters create large
8 heavy metal anomalies everywhere.

9 **Q. Other than Rustin and Spelter,**
10 **did you look at any other particular smelters?**

11 A. Not in this paper, but I've
12 worked on a number of other smelters.

13 **Q. Which ones?**

14 A. I've worked on the Blackwell
15 smelter in Blackwell, Oklahoma. Did you
16 depose me in that one?

17 **Q. I did. I did.**

18 **And so, Dr. Flowers, what did**
19 **you do in the Blackwell smelter?**

20 A. Well, there are two components
21 to the Blackwell, there were two cases, both
22 of them involved Kay County, Oklahoma. The
23 first one was soil sampling, and what I was
24 doing was sampling the right-of-way because
25 the county was concerned that workmen for

1 the city would be exposed if they dug and
2 got dirty and etc. because the soils were
3 contaminated, and in that one I sampled the
4 city, the right-of-ways, and then I found
5 out what background was in the same general
6 area, and that was settled, as far as I
7 knew. The second case involved the disposal
8 of retort fragments. The smelter provided
9 both to the city and individuals retort
10 fragments, so these retorts, as you know,
11 are clay vessels, and they were manually
12 charged with reductant, which is usually
13 coke or something like that plus the ore,
14 and then they're heated and the zinc is
15 tapped off manually and poured into a mold,
16 etc., but they have a finite lifetime because
17 they're ceramic vessels, and so when
18 they're -- they develop cracks, sometimes
19 they even exploded periodically, that must
20 have been spectacular, they would have to
21 dispose of them and they had a pottery shop,
22 they made new ones and recycled them.
23 Meanwhile, they're collecting a whole bunch
24 of shards, if you will, rather big shards of
25 pottery lined with smelter waste, and they

1 gave them to the city and other people and
2 they got dispersed throughout Kay County.
3 They were used as road metal, you can find
4 them alongside of the road, you can find
5 them in around, say, drainage pipes, I found
6 them there, you can find them in creeks,
7 sometimes in large accumulations, and there
8 was a dispute on whether or not they were a
9 nuisance and whether or not they needed to
10 be cleaned up.

11 **Q. And it's correct to say that**
12 **both of the projects that you worked on on**
13 **Blackwell, you didn't evaluate the historical**
14 **impact from air emissions from that facility;**
15 **correct?**

16 A. I looked at the end result,
17 which would be what was in the soils.

18 **Q. Well, if I understood the**
19 **testimony that you just gave in a relatively**
20 **long answer, mainly you were looking at the**
21 **waste materials like the broken retorts;**
22 **correct?**

23 A. Well, there are two cases.
24 Which case are you talking about?

25 **Q. So was there a case where you**

1 evaluated soils for --

2 A. Yes.

3 Q. -- historical --

4 A. That was the first case I
5 described.

6 Q. Okay.

7 A. The second one was the retort
8 case.

9 Q. And where -- the first case that
10 you described was exposure of Kay County
11 workers on the road; is that right?

12 A. That's the way it was presented
13 to me. The county was concerned that there
14 was an added risk and exposing people
15 working along the right-of-way, telephone,
16 plumbing, drainage, whatever, if they didn't
17 know what was in the soil, they might be
18 accidentally exposed.

19 Q. And it's your testimony that as
20 part of that work, you evaluated potential
21 lead and arsenic contributions to the soil
22 from historical air emissions?

23 A. Yes. And I also determined
24 background levels for that area.

25 | (Exhibit 545, report entitled

1 Chemical Stability of Blackwell Zinc
2 Smelter Waste in Kay County Oklahoma by
3 George C. Flowers, Ph.D., May 21, 2013,
4 marked for identification, as of this
5 date.)

6 **Q. I show you a document that I've**
7 **marked as Exhibit 545.**

8 **Can you identify Exhibit 545 for**
9 **the record?**

10 A. It's entitled Chemical Stability
11 of Blackwell Zinc Smelter Waste in Kay County,
12 Oklahoma by George C. Flowers, May 21, 2013.

13 **Q. And is Exhibit 545 the expert**
14 **report for the work that you've been**
15 **describing related to exposure of workers on**
16 **Kay County roads?**

17 A. Nope.

18 **Q. This is the second case?**

19 A. This is the second case.

20 **Q. Did you prepare a report in**
21 **connection with the first case?**

22 A. No.

23 **Q. Did you do any sort of**
24 **quantitative comparison between the**
25 **operation of the -- historical operation of**

1 the Blackwell smelter and the USMR smelter
2 as part of this case?

3 A. No.

4 Q. So the purpose in, you know,
5 sort of mentioning the Blackwell situation
6 in your report here was similar to --

7 A. I didn't --

8 Q. -- or I don't even know, did
9 you --

10 A. I didn't mention it.

11 Q. You didn't mention it. Okay.

12 All right.

13 Other than the Blackwell smelter,
14 any other smelters that you worked on?

15 MR. GERMAN: Objection to form.

16 You can answer.

17 A. I currently am involved in a
18 project at the attorney work product stage.

19 Q. Okay.

20 And so that's not something
21 that -- you're still covered by privilege --

22 A. Yes.

23 Q. -- is that right?

24 A. Yes.

25 Q. All right.

1 **Anything else other than that**
2 **project?**

3 A. No.

4 Q. **Okay.**

5 **Have you ever evaluated lead**
6 **paint as an alternate source of lead -- for**
7 **lead concentrations in soil other than this**
8 **case?**

9 **MR. GERMAN:** Objection to form.

10 You can answer.

11 A. I -- I don't remember any where
12 it really was an issue, so -- I was asked to
13 do it in this case.

14 Q. **So as you sit here today, your**
15 **best recollection is that this is the first**
16 **time you've tried to look at lead paint as a**
17 **possible source for lead in soils?**

18 A. I mean, it's always --

19 **MR. GERMAN:** Objection to form.

20 You can answer.

21 A. It's always out there as a
22 possibility, but, in my opinion, compared to
23 a smelter which produces 70,000 tons of
24 copper from a -- what may be a low-grade
25 concentrate, there's a tremendous amount of

1 waste, tons, produced by the process, and it
2 far outstrips lead paint as a source.

3 **MR. SUTHERLAND:** Objection.

4 non responsive.

5 **Q.** My question really was: As you
6 sit here today, you cannot remember another
7 project other than this one where you've
8 done a forensic evaluation to determine
9 whether lead-based paint accounted for all
10 or part of the lead present in soil?

11 **MR. GERMAN:** Objection to form.

12 You can answer.

13 **A.** That's correct.

14 **Q.** Have you had a project where you
15 worked with the New Jersey Department of
16 Environmental Protection?

17 **A.** Yes.

18 **Q.** When was the last time you had a
19 project where you were working directly with
20 the New Jersey Department of Environmental
21 Protection?

22 **A.** Well, it depends what you mean
23 by work with. I've been in projects --
24 because I've worked in New Jersey on several
25 different cases, I've had to interact with

1 NJ DEP and we've had meetings with them, so
2 I would -- but I wouldn't call it work with
3 except in the meeting we talked about
4 things, and like that; yeah.

5 Q. **When was the last --**

6 A. But not being hired by them to
7 do a project or anything.

8 Q. **When was the last time you had a
9 meeting with NJ DEP?**

10 A. Probably it was -- oh, geez --
11 more than ten years ago.

12 Q. **Do you remember the project?**

13 A. It was the Honeywell site in
14 Elizabeth, I think it's Elizabeth; yeah.

15 Q. **And what was --**

16 A. On the Hoboken.

17 Q. **And what were the contaminants
18 of concern there?**

19 A. Hexavalent chromium.

20 Q. **And what was the purpose of the
21 meeting with the NJ DEP?**

22 A. We were talking over different
23 analytical methods for detecting hexavalent
24 chromium in soils.

25 Q. **And what were the analytical**

1 **methods that were under discussion?**

2 A. Well, you know, they're -- EPA
3 has promulgated probably three different
4 methods. One is alkaline extraction followed
5 by a colorimetric test, the other one
6 essentially is an alkaline extraction
7 followed by a clean-up that removes
8 interfering organics, and then colorimetric
9 determination, and the final one would have
10 been an isotopic analysis. Chromium has a
11 number of different isotopes. That's
12 extremely complicated, and we were talking
13 about whether or not it was -- that's one
14 thing we talked about, whether or not it was
15 worth it to go there for a large site that
16 was being remediated like the Honeywell
17 site.

18 **Q. And was one of the purposes for**
19 **those analytical to do forensic evaluation**
20 **of where that hexavalent chromium came from?**

21 A. No. It was all said and done,
22 it had been litigated all the way out.

23 **Q. So it was just --**

24 A. The remedy was in place and they
25 were executing.

1 **Q.** **Okay.**

2 A. And so they wanted to evaluate
3 the remedy in terms of finding a clean edge.

4 **Q.** **Have you talked with anybody**
5 **with New Jersey Department of Environmental**
6 **Protection in connection with this case?**

7 A. No.

8 **Q.** **You have rendered opinions in**
9 **the past regarding background concentrations;**
10 **correct?**

11 A. Yes.

12 **Q.** **Are you rendering any opinions**
13 **regarding background in this case?**

14 A. Yes. I give a table where I --
15 and we can refer to it, it's the first
16 table, where I kind of looked around and saw
17 what people were proposing and thought about
18 them and did an evaluation in my mind about
19 them.

20 **Q.** **So are you rendering an opinion**
21 **regarding the quantitative, this is what**
22 **background is for lead, for example, in this**
23 **case?**

24 **MR. GERMAN:** Objection to form.

25 A. Yes. In my opinion, the natural

1 background, which is perhaps the most relevant,
2 is less than 20, the arsenic is again less
3 than 20 for sure, probably less than 10, and
4 copper is 20, 30, 40, something like that.
5 Those are the natural background levels.

6 **Q. And are you rendering an opinion**
7 **regarding the background levels in the**
8 **proposed class area where background is not**
9 **only natural background, but also non-site**
10 **related anthropogenic background?**

11 A. Well, I think that trying to do
12 that in the vicinity of a smelter is wrong.
13 The reason is that the general guidance is
14 to stay away from hazardous waste facilities
15 when you're doing your sampling to try to
16 get background, and so if you use data from
17 the site area, the class area, for example,
18 and try to get a background number, there's
19 no way you'll screen out the effect of the
20 smelter.

21 Q. All right. Why don't we take a
22 break. We gotta change the video anyway.

23 **THE VIDEOGRAPHER:** All right.
24 We will go off the record at 10:08
25 ending media 1.

3 **THE VIDEOGRAPHER:** We are back
4 on the record at 10:12. This is media 2
5 in the deposition of Dr. Flowers.

6 | CONTINUED BY MR. SUTHERLAND:

7 Q. All right. I'm going to direct
8 you to your report, Dr. Flowers, Exhibit
9 543, and if you could look at page 12 for
10 me, please.

11 A. Okay.

Q. And there at the bottom of the page there's an underlined italicized section that starts with Background Soil Loading and Soil Spinning Levels.

16 Do you see that?

17 A. Yes.

18 Q. And the first sentence states,
19 and this is your statement, generally
20 industry is not required to clean up below
21 the background levels of soil constituents.

Did I read that correctly?

23 A. Yes.

24 Q. And that's generally consistent
25 with your experience; correct?

1 A. Yes. Natural background more
2 specifically.

3 Q. **But it doesn't say natural**
4 **background. It says industry --**

5 A. But that's what they say.

6 Q. **They say natural background?**

7 A. Yes.

8 Q. **That's your experience?**

9 A. Yes.

10 Q. **Even --**

11 A. It's in the deposition -- one of
12 the depositions.

13 Q. **Even if it's in non-site-**
14 **related -- if the contamination comes from**
15 **non-site related sources?**

16 **MR. GERMAN:** Objection to form.

17 You can answer.

18 A. Well, if you look at in the
19 deposition, there is a quote, I think it's
20 Dr. Singh, that says natural background is --
21 absolutely we don't clean below that,
22 anything else is subject to all of these
23 different processes, regulatory processes,
24 litigation, etc.

25 Q. **Is it your testimony that you**

1 know from your own, you know, expertise that
2 that's the rule that gets applied in New
3 Jersey?

4 MR. GERMAN: Objection to form.

5 You can answer.

6 A. Again, I'm pretty sure they do
7 not require you to clean below background,
8 natural background.

9 Q. Did they require you to clean
10 below background that includes non-site-
11 related anthropogenic entities?

12 A. They might.

13 Q. You don't know whether --

14 A. If you can -- if you can
15 demonstrate, you know, that -- convince --
16 if you can't convince them that it is an
17 anthropogenic background, they might make
18 you clean it up.

19 Q. Well, do you know if the State
20 of New Jersey has established background
21 levels that include both natural background
22 and general area sources of anthropogenic
23 impacts?

24 MR. GERMAN: Objection. You can
25 answer.

1 A. There are a number of papers
2 where clearly there's some anthropogenic
3 data mixed in with more natural background
4 numbers, so they have a marble cake answer.

5 Q. **And do you know whether or not**
6 **the statutory definition under New Jersey of**
7 **the natural background level includes**
8 **influences of non-site related anthropogenic**
9 **entities?**

10 A. Not if it's natural.

11 Q. **Do you know what the statute says?**

12 A. It says natural background, and
13 to me my interpretation of natural background
14 is, is that it would be the amount that's
15 present due to the weathering of the
16 underlying bedrock in the absence of any of
17 man's anthropogenic inputs, so that's the
18 natural background.

19 (Exhibit 546, study entitled
20 Ambient Levels of Metals in New Jersey
21 Soils by Paul F. Sanders, Ph.D.,
22 bearing Bates Nos.

23 NEWFIELDS_CNJ00008751-8756, marked for
24 identification, as of this date.)

25 Q. **Okay. Well, I'm going to hand**

1 you a document that I've marked as Exhibit 546.

2 A. Okay. Oh, this guy.

3 Q. Have you seen Exhibit 546 before?

4 A. I have.

5 Q. And Exhibit 546 is a study of
6 the Ambient Levels of Metals in New Jersey
7 Soils by Paul F. Sanders; correct?

8 A. Yes.

9 Q. And Paul F. Sanders is an
10 employee of the Department of Environmental
11 Protection; correct?

12 A. That's correct.

13 Q. And if you look under the
14 introduction, you see it states there
15 current New Jersey law requires that the
16 NJDEP determine background levels of
17 contaminants in soils and that remediation
18 of contaminated areas shall not be required
19 below regional natural background levels for
20 any particular contaminant; correct?

21 A. Right.

22 Q. And then the next sentence goes
23 on to state: Natural background level is
24 further defined as the concentration of a
25 contaminant consistently present in the

1 environment of the region of the site and
2 which has not been influenced by localized
3 human activities.

4 **Do you see that?**

5 A. Yes.

6 Q. And then the next sentence goes
7 on and states: Therefore, naturally
8 occurring constituents in soil and those
9 resulting from regional deposition are
10 included, but not those from point
11 contamination sources.

12 **Do you see that?**

13 A. I see that, but I see those two
14 sentences as contradicting each other.

15 Q. Well, but you would agree with
16 me that Mr. Sanders as an employee of the
17 Department of Environmental Protection
18 published this article and says that in --
19 and states that under New Jersey statute,
20 that anthropogenic activities resulting from
21 regional deposition are included in background;
22 right?

23 **MR. GERMAN:** Objection.

24 A. You would have to show me the
25 statute.

1 Q. **You can agree with me that's**
2 **what this paper says?**

3 A. That's what it says, but show me
4 the statute.

5 Q. **Okay.**

6 **Do you know if the background**
7 **numbers that are reported in Exhibit 546**
8 **include regional anthropogenic impacts for**
9 **lead?**

10 A. Absolutely.

11 Q. **And you cited for your**
12 **background table the BEM systems study that**
13 **was done in 1970; correct?**

14 A. Right.

15 Q. **And I assume that since you**
16 **cited it in your paper, you believe it was a**
17 **well done study?**

18 A. I thought it was a well done
19 study in the sense that they made an effort,
20 a good faith effort to try to figure out
21 what the natural background was in a state
22 where it's quite a challenge to figure out
23 what natural background is. New Jersey's
24 heavily industrialized and particularly in
25 this area, the urban Piedmont area, there

1 are numerous hazardous waste sites, numerous
2 emitters, and it's a real challenge to try
3 to keep those out of a data set trying to
4 figure out what natural background is.

5 **Q. Do you know how they chose their**
6 **sample sites for the 1997 urban Piedmont**
7 **study?**

8 A. Yeah. I think they looked at a
9 variety of different land use types. They
10 tried to stay away from point sources where
11 they could identify them. But when you're
12 taking a soil sample, you don't know for
13 sure what has happened, where that soil
14 sample has happened. You only know after
15 the fact, after you've analyzed it.

16 **Q. What type of properties did they**
17 **sample?**

18 A. They sampled urban, suburban,
19 farm, agricultural. For example, they
20 stayed away from a golf course because they
21 put a lot of chemicals on a golf course to
22 maintain the turf. They looked at a variety
23 of different ones. I thought they did a
24 reasonable approach to a difficult problem
25 in New Jersey.

1 Q. So it's your testimony that the
2 **1997 study for the urban Piedmont sampled**
3 **farms?**

4 A. Well, I don't know whether they
5 actually sampled farms. They -- you know,
6 I'd have to review it. They might have, you
7 know, they sampled a variety of different
8 land use types.

9 Q. And so it's your testimony that
10 **the 1997 study included rural samples?**

11 A. Yes. See, if you sampled up in
12 the industrial corridor, your background
13 would be blown off of the face of the earth.
14 If you sampled just in the farms -- not
15 farms, but rural areas, you would get a
16 better estimate of what would be derived
17 from the rocks that are in this area.

18 Q. Did you evaluate the individual
19 data points that were reported from the 1997
20 BEM study cited in your report?

21 A. Not one by one. I looked at
22 some of them and noticed that this cannot be
23 a background number.

24 Q. You discussed in your report the
25 upper confidence limit of the data that was

1 **reported in the 1997 BEM study; correct?**

2 A. Yes.

3 Q. **Isn't it correct that the**
4 **regulatory agencies when they're looking**
5 **at background, they don't use the upper**
6 **confidence limit, they use the upper**
7 **tolerance limit; correct?**

8 A. Not necessarily. I've seen it
9 both ways.

10 Q. **Have you seen what New Jersey**
11 **does?**

12 A. New Jersey probably does it with
13 an upper tolerance limit. West Virginia
14 does it with an upper tolerance limit. My
15 problem with an upper tolerance limit is
16 that unless you know exactly the shapes of
17 the distributions between contaminated and
18 pristine or natural, whatever word you want
19 to use, you don't know the degree of overlap
20 between the two. So if you use a low
21 probability estimator, which is the 95th
22 percentile, the odds of you being right are
23 not very large because it's not a very
24 probable answer, and there can be significant
25 overlap of contamination way down below it,

1 so the mean is a more probable answer, and
2 to give some error, you use the upper
3 confidence limit of the mean, I think that's
4 a better measure of characterizing the
5 population. In fact, the mean is the best
6 estimator of the population.

7 Q. Well, Dr. Flowers, it's correct
8 to say that even if we're looking at natural
9 background the way that you defined it, not
10 the way New Jersey has defined it, that the
11 background concentrations are distribution;
12 correct?

13 MR. GERMAN: Objection to form.

14 You can answer.

15 A. Sure.

16 Q. And that distribution may be a
17 normal distribution or it may be log-normal
18 or it may have no statistical character at
19 all; correct?

20 A. It has some statistical character,
21 whether you can describe it or not with an
22 equation.

23 Q. But notwithstanding whatever
24 that distribution happens to be, if you're
25 looking at the mean, then some percentage of

1 the natural background samples that you got
2 are going to be greater than that value, just
3 by definition; right?

4 A. Sure.

5 Q. And so if you establish a
6 clean-up level based upon the mean, then you
7 are making a decision that you're going to
8 be cleaning up some concentrations that are
9 close to that clean-up level that very
10 likely may be natural background; right?

11 A. It's a possibility. However,
12 you know, when we're talking about clean-up,
13 it depends on your philosophy. Is your
14 philosophy to err on the side of caution or
15 is it to err on the side of just leaving
16 contamination in place.

17 Q. And what -- I mean, what we're
18 really talking about here is that your
19 philosophy using the mean or the upper
20 confidence limit is different from those
21 regulatory agencies that choose to use the
22 upper tolerance limit; correct?

23 MR. GERMAN: Objection to form,
24 foundation. You can answer.

25 A. Yes, it is. So to turn your

1 statement around, you could leave
2 contamination in place with the approach
3 that you're advocating, and we don't know
4 what impact that might have on a human
5 population. I would prefer to be more
6 conservative relative to the human population
7 rather than the responsible party.

8 **MR. SUTHERLAND:** Objection.

9 non responsive to the last point.

10 Q. Dr. Flowers, have you spoken
11 with Mike McNally?

12 A. No, I haven't.

13 Q. Do you know who he is?

14 A. Yes. He's the licensed
15 remediation guy.

16 Q. Yes. LSRP?

17 A. Yeah.

18 Q. I don't know what it stands for
19 either.

20 Did you read Mr. McNally's
21 deposition?

22 A. Yes, I did, a while back.

23 Q. Before you issued your report,
24 that is, the May 6 report, had you looked at
25 any of the other plaintiff's expert reports?

1 A. No.

2 Q. **Had you spoken to any of them?**

3 A. Which date are you talking
4 about? May 10?

5 Q. **The first one, May 6.**

6 A. The first one?

7 Q. **Yes.**

8 A. Yes. There probably was a
9 conference call with the attorneys where we
10 talked about what we found to some degree,
11 but not extensively, but by then I had
12 written my report, so they didn't -- I
13 didn't rely on them and I'm -- in reading
14 their reports, they didn't rely on me except
15 to say, Dr. Flowers, you know, like I did, a
16 courtesy citation.

17 Q. **Okay.**

18 **And before you issued your**
19 **June 10 revised version, had you read the**
20 **depositions of Singh and Blum and Rosenfeld**
21 **and Sullivan?**

22 A. Let's see. The 10th would have
23 been last Monday. I would have read some of
24 them. I don't remember which ones I would
25 have read.

1 Q. **Okay.**

2 A. Anything -- say they came in,
3 and as they came in, I read them.

4 Q. **But you're not relying on any of**
5 **that deposition testimony --**

6 A. No.

7 Q. **-- in connection with your**
8 **report?**

9 A. No, I'm not.

10 Q. **Did you read Mr. Bruner's**
11 **deposition?**

12 A. A long time ago, it seems like;
13 yes.

14 Q. **Did you read Mr. Finn's**
15 **deposition?**

16 A. Yes. A long time ago.

17 Q. **And did you read Lisa Szegedi's**
18 **deposition?**

19 A. I don't remember that one.

20 Q. **Okay.**

21 A. Who is she?

22 Q. **She was the remediation -- the**
23 **principal person at Arcadis overseeing the**
24 **remediation.**

25 A. I probably saw the name, but

1 never talked to her.

2 Q. Okay.

3 A. Or never read anything except a
4 report. If she wrote the Arcadis report, I
5 might have read it.

6 Q. And her -- just to be fair to
7 you, her deposition transcript doesn't
8 appear in your materials that you --

9 A. Okay.

10 Q. Did you read Jeff Kurtz's
11 deposition?

12 A. Who is he?

13 Q. You actually cite him in your
14 report on page 24.

15 A. Let me see. Maybe that will
16 help me.

17 Q. It's under -- the first section
18 under Other Possibilities.

19 A. Jeff Kurtz?

20 Q. Yes.

21 A. Yeah, I did read that one.

22 Q. And if you look at your quote
23 there from Dr. Kurtz's deposition, he talks
24 about his presentation to the LSRP. It's in
25 the italicized section of the report.

1 A. Yeah. What page was that on?

2 Q. 24.

3 (Witness reviewing document.)

4 A. I don't know what the hell
5 this -- this means.

6 Q. Okay.

7 A. I don't think any of that can be
8 proved.

9 Q. Yeah, well, my question is
10 really more focused than that, and that is
11 you cite -- in the citation that you pulled
12 out of his deposition --

13 A. Right.

14 Q. -- he references a presentation
15 that was made to the LSRP.

16 | Do you see that?

17 A. Yes.

18 | Q. Did you see that presentation?

19 A. No.

20 Q. Did you ask for it?

A. No. I don't think so.

Q. Did you get the exhibi

23 | Dr. Kurtz's deposition?

24 A. I don't think I looked at them;
25 no.

1 **Q.** So that wasn't in your mind
2 necessary to render the opinions that you
3 rendered in Exhibit 543?

4 **MR. GERMAN:** Objection.

5 **A.** I don't --

6 **MR. GERMAN:** You can answer.

7 **A.** No, I don't -- for the opinions
8 in my report, absolutely not.

9 **Q.** Okay.

10 **A.** To quote this, you know, this
11 was more a lead-in to the subsequent
12 discussion of, you know, alternate sources.
13 Up to that time, this is the list. I expect
14 the list will get longer.

15 **Q.** Well, you recall, Dr. Flowers,
16 that from Dr. Kurtz's deposition that one of
17 the things that he discussed extensively in
18 his deposition is the various lines of
19 evidence that support the presence of other
20 sources of -- particularly of lead.

21 **Do you recall that?**

22 **A.** I would change your wording.
23 That support the hypothesis of other
24 sources. The presence implies a fact. I
25 don't think, you know, significant other

1 sources have been proved.

2 Q. Okay.

3 But you understand that that was
4 one of the major topics of Dr. Kurtz's
5 deposition; right?

6 A. I think he looked at those
7 things; yeah.

8 Q. And it wasn't important to you
9 in evaluating the scientific validity of
10 Dr. Kurtz's points to look at the primary
11 presentation where he put together his
12 support for that?

13 MR. GERMAN: Objection to form.

14 And I would ask that you put the
15 document in front of him so out of the
16 universe of documents in the case he
17 could see whether he looked at it or
18 not instead of asking him off of memory
19 whether out of the tens of thousands of
20 documents in this case, he saw
21 something.

22 Q. You can answer the question.

23 A. Okay. I read his deposition and
24 I wasn't very convinced that he had anything
25 to go with, and so what I took his

1 deposition as a jumping off point for me to
2 look at independently.

3 **Q. And you felt it was unnecessary**
4 **to look at the specific support for the**
5 **lines of evidence that he discussed in his**
6 **deposition?**

7 **MR. GERMAN:** Objection. Hold
8 on. Lewis, you are not here to trick
9 the man, you are here to get factual
10 response, so why don't you show him
11 what it is so he knows whether he
12 looked at it or not instead of trying
13 to test his memory as to whether or not
14 he saw that particular document.

15 **MR. SUTHERLAND:** Steven, your
16 colleague, Chris Nidel, does this for
17 three or four hours in the deposition
18 in every single deposition. I don't
19 have to show him the document. I'm
20 entitled to know what he knows now
21 without seeing it and I'm --

22 **MR. GERMAN:** I know, but you are
23 running the risk of getting answers
24 that are not accurate because he --

25 **MR. SUTHERLAND:** I'm not --

1 **MR. GERMAN:** -- may have seen a
2 document and he just doesn't recall it.

3 **MR. SUTHERLAND:** I'm not going
4 to argue with you. Either --

5 **MR. GERMAN:** Okay.

6 **MR. SUTHERLAND:** -- lodge your
7 objection or, you know, or if you feel
8 it's necessary, instruct the witness
9 not to answer.

10 **MR. GERMAN:** Okay.

11 **MR. SUTHERLAND:** But I've asked
12 my question.

13 **MR. GERMAN:** I don't have to
14 instruct not to answer, but if you're
15 asking questions about a document, then
16 put the document in front of him so
17 that he could answer the question about
18 it. It makes a lot more sense to get
19 factual information at a deposition.

20 **MR. SUTHERLAND:** I'm not going
21 to argue, Steven.

22 **MR. GERMAN:** Okay.

23 **Q.** Go ahead.

24 **MR. GERMAN:** I'm going to
25 instruct the witness not to guess --

1 **THE WITNESS:** I'm not going to
2 guess.

3 **MR. GERMAN:** -- as to whether or
4 not he saw something out of the
5 universe of documents in the case, and
6 if you need to see the document, ask to
7 see the document, that's going to be my
8 instruction, but you can answer the
9 question to the best of your ability
10 without the document in front of you.

11 **THE WITNESS:** Okay.

12 A. My answer is that in this case
13 it's been kind of different because I prefer
14 to evaluate things with an expert report in
15 front of me rather than deposition, and so a
16 deposition with a bunch of exhibits behind
17 it, I read the deposition and I -- I
18 evaluate it. I consider that a preliminary
19 evaluation. I will not know what I
20 really -- my true opinion of Kurtz's work
21 until I see his expert report, have time to
22 read it and evaluate it. I may go back to
23 the deposition, I may go back to the exhibits,
24 but I would not, you know, he just presents
25 a laundry list and I made note of it and I

1 tried to make some comments about it in my
2 report. That's what I did.

3 (Exhibit 547, Evaluation of AOC
4 Boundary for USMR Soil Project, October
5 26, 2018, by Geosyntec Consultants,
6 bearing Bates Nos. USMF01074655-4750,
7 marked for identification, as of this
8 date.)

9 Q. I'm handing you a document that
10 I've marked as Exhibit 547.

11 Do you recognize Exhibit 547?

12 A. No.

13 Q. Have you ever seen it before?

14 A. No.

15 Q. So I'll represent to you that
16 this is the presentation that Jeff Kurtz
17 gave to the LSRP on October 26 of 2018.

18 A. Okay.

19 Q. It's your testimony that you've
20 never seen it before?

21 A. Yes.

22 Q. And this document that we've
23 marked as Exhibit 547 was Exhibit 454 to
24 Dr. Kurtz's deposition.

25 Do you understand that?

1 A. I don't know.

2 Q. And it's your testimony that you
3 did not look at this exhibit in connection
4 with your review of Dr. Kurtz's deposition;
5 correct?

6 A. That's true.

7 Q. Do you know if there were other
8 presentations that were made to the LSRP in
9 October of 2018?

10 A. Dr. Sullivan alludes to other
11 presentations and other people's work on
12 alternate sources and stuff like that, but I
13 didn't look at any of that.

14 Q. And do you recall from Dr. Kurtz's
15 deposition testimony that took place in
16 December of 2018 that there were references
17 to presentations made by other experts to
18 the LSRP?

19 A. I don't remember.

20 (Exhibit 548, document entitled
21 Overview of Alternate Sources of
22 Copper, Lead and Arsenic, bearing Bates
23 Nos. USMR01155853-01155926, marked for
24 identification, as of this date.)

25 Q. I'm going to hand you a document

1 that I've marked as Exhibit 548.

2 Have you ever seen Exhibit 548?

3 A. No.

4 Q. And Exhibit 548 was Exhibit 437
5 to Dr. Kurtz's or I'm not sure if it's
6 Ms. Is a Getty's or Dr. Kurtz's deposition,
7 but you don't recall seeing any discussion
8 about Exhibit 548 in Dr. Kurtz's; correct?

9 A. I don't recall it; no.

10 (Exhibit 549, Newfields Carteret
11 Forensic Microscopy Investigation
12 bearing Bates Nos. USMR01074778-4797,
13 marked for identification, as of this
14 date.)

15 Q. I'm handing you a document that
16 I've marked as Exhibit 549.

17 Do you recognize Exhibit 549?

18 A. No.

19 Q. You've never seen Exhibit 549
20 before?

21 A. No.

22 Q. This was also previously, you
23 know, produced in connection with the
24 presentation to the LSRP and has previously
25 been marked as Exhibit 406 in prior

1 depositions, but it's your testimony you've
2 never seen it before?

3 A. I've never looked at it. I will
4 say that some things or so much paper flying
5 around labeled Newfields, but I was not
6 directed to look at them.

7 Q. Did you look at any of -- well,
8 let me start back and set a foundation.

9 There are a number of Newfields
10 PowerPoints that are included in your
11 produced materials.

12 A. Yeah.

13 Q. Did you look at those?

14 A. No.

15 Q. Why not?

16 A. I wasn't directed to, I wasn't
17 tasked.

18 Q. Okay.

19 So you haven't evaluated any of
20 the analyses that are included in those
21 Newfields presentations even though you had
22 possession of them --

23 MR. GERMAN: Objection.

24 Q. -- correct?

25 MR. GERMAN: Objection.

1 A. That's true. Again, my
2 preference is to evaluate them with the
3 expert report. A PowerPoint in and of
4 itself, particularly when I wasn't there to
5 hear what was said, doesn't seem like a very
6 smart way to evaluate something.

7 Q. **But you're not really in a**
8 **position to say that, are you, Dr. Flowers --**

9 A. I absolutely am in a position --
10 if there's a PowerPoint and there's someone
11 talking and I wasn't there, I don't know
12 what was said about this or what it means.
13 I would prefer to see an expert report that
14 has -- that talks about this stuff.

15 Q. **Do you -- if you're evaluating**
16 **the importance of data, does it matter**
17 **whether or not that data is presented on a**
18 **piece of paper generated by PowerPoint or**
19 **whether that data is presented on a piece of**
20 **paper that was generated by Word?**

21 **MR. GERMAN:** Objection to the
22 form of the question. You can answer.

23 A. To answer the question, no, but
24 this is a piece of intellectual property. I
25 have no foundation to evaluate it with.

1 **MR. SUTHERLAND:** Objection,
2 non responsive everything after no.

3 **Q.** Did you evaluate the Newfields
4 documents that you were provided to determine
5 whether or not they had any data that were
6 relevant to the questions that you were
7 asked to assess as part of your report?

8 A. No. But I may be called upon in
9 the future to do that.

10 **Q.** Yeah, but you could have done
11 that right after you got --

12 A. I could have done lots of
13 things, but I didn't do this.

14 **Q.** Right.

15 A. Because I wasn't tasked.

16 **Q.** Okay. That's fine.

17 Did you review Dr. Mattingly's
18 deposition in this case?

19 A. You'll have to identify him.
20 They're all running together now.

21 **Q.** Steve Mattingly --

22 A. Who is he?

23 **Q.** Steve Mattingly with Newfields.
24 He did the microscopy work.

25 A. I don't remember that one. I'll

1 just -- I just don't remember.

2 Q. Okay.

3 Did you review Dr. McVehil's
4 deposition?

5 A. Yes, I did. I read it.

6 Q. Did you review a deposition by
7 AJ Gravel? He's a historian.

8 A. I don't remember that one. I know
9 the name, but I don't remember that one.

10 Q. Did you review a deposition by
11 Dr. Rouhani? He's a Newfields geostatistician.

12 A. Again, I don't remember it.

13 Q. Did anybody assist you in the
14 preparation of Exhibit 543, your report?

15 A. No.

16 Q. You wrote it all yourself?

17 A. I wrote it all myself. One stop
18 shopping.

19 Q. If you could turn in your
20 report, Exhibit 543, and go to page 1, and
21 if you look at the first numbered -- the
22 second numbered paragraph, the one that's
23 numbered 2.

24 A. Again, the page?

25 Q. It's page 1, Summary of Opinions.

1 A. Okay.

2 Q. And under numbered paragraph 2,
3 it's the middle sentence that begins
4 contamination was transported.

5 Do you see that?

6 A. Yes.

7 Q. And the sentence reads:
8 Contamination was transported into Carteret
9 by wind as fugitive dust, particulate
10 matter, and gaseous emissions, derived from
11 the cupola and other furnaces, that cooled,
12 condensed, and settled to the ground,
13 blanketing the proposed Class Area.

14 A. Yes.

15 Q. Did I read that correctly?

16 A. Yes.

17 Q. And are you familiar with the
18 term conceptual site model?

19 A. Yes.

20 Q. And as I understand it -- well,
21 why don't you tell me what you understand
22 conceptual site model to mean.

23 A. Conceptual site models are
24 usually employed in remedial investigation
25 to try to determine how contaminants may

1 have moved off site, the different pathways.

2 Q. And is it correct --

3 A. Where they might -- and where
4 they might reside.

5 Q. And is it correct to say that
6 your hypothesis or maybe even it's your
7 opinion that's contained in your report is
8 that the predominant conceptual site model
9 for the USMR's facility for impacts within
10 the proposed class area is described in this
11 sentence that we just read?

12 MR. GERMAN: Objection to form.

13 You can answer.

14 A. Essentially, yes.

15 Q. And so essentially, what you're
16 saying is that the mechanism for the USMR
17 smelter impacts was the deposition of
18 airborne dust from fugitive and point source
19 emissions?

20 A. I would say particulates.

21 Q. Okay.

22 And those particulates came from
23 both fugitive sources and from point sources?

24 A. I would say they're a contribution
25 of fugitive dust and stack emissions.

1 Q. There's a comment on page 10 of
2 your report, it's the last sentence in the
3 first paragraph under brief history of the
4 Carteret smelter.

5 A. Okay.

6 Q. Tell me when you're there.

7 (Witness reviewing document.)

8 A. Where --

9 Q. And the last sentence of that
10 paragraph reads: Not unlike smelters
11 discussed above, it -- and then referring
12 the USMR smelter -- closed in a period of
13 increasing regulatory pressure to reduce air
14 pollution beginning in 1955; specifically,
15 it closed because of uncontrollable, ambient
16 lead pollution in the air, with a citation
17 to CH2MHILL.

18 Do you see that?

19 A. Yes.

20 Q. What -- other than the citation
21 to CH2MHILL, is your conclusion that the
22 smelter closed because of uncontrollable
23 ambient lead pollution in the air, is there
24 any other source that you're relying on for
25 that conclusion?

1 A. There's a lawsuit of the State
2 of New York versus USMR talking about lead,
3 ambient lead over Staten Island, and usually
4 it's not one thing that causes a smelter to
5 close. It's a combination of economics and
6 regulatory pressures that come up, and by
7 1986 it was too much for the smelter, and
8 they decided to close it.

9 Q. **And you're not rendering**
10 **opinions with respect to how all those**
11 **various economic and other factors combine**
12 **to result in the closure of the smelter, are**
13 **you?**

14 A. No.

15 Q. **And you understand that this the**
16 **CH2MHILL was an adverse party in litigation**
17 **against USMR at the time that this citation**
18 **that you have in your report was created?**

19 A. Yes.

20 Q. **Have you done any evaluation of**
21 **the ambient air testing that was done around**
22 **the USMR facility in the mid to late '80s?**

23 A. No.

24 Q. **And so your opinion that we've**
25 **been talking about here, or maybe it's not**

1 even an opinion, but your notation in your
2 report on page 10, you're not relying on any
3 of the ambient air testing that was done;
4 correct?

5 A. No. I'm looking at the soil data.

6 Q. Okay.

7 And just another sort of stray
8 comment in your report I wanted to follow up
9 on, if you turn to page 20, and it's in the
10 middle of the page a sentence that starts
11 sort of also in the midpoint of the line,
12 some smelters were able to remain viable.

13 Do you see that?

14 A. Yes.

15 Q. Okay.

16 So the whole sentence reads:
17 Some smelters were able to remain viable as
18 long as commodity prices remained high
19 enough; regulatory fines probably had little
20 to do with their demise because they were
21 effectively part of the operational overhead.

22 Did I read that correctly?

23 A. Yes.

24 Q. And the first part of that
25 sentence is really going to the comment that

1 you made before, that there may have been
2 economic factors that drove the closure of
3 the smelter as well; right?

4 A. Coincident, perfect storm.

5 Q. But then the last part of that
6 sentence, regulatory fines probably had
7 little to do with their demise because they
8 were effectively part of the operational
9 overhead, did you do any evaluation of how
10 the USMR facility accounted for any fines it
11 may have had to pay?

12 A. I remember seeing a document
13 which was a very strange document because it
14 had a total of profits on one side and a
15 total of fines on the other side, and as you
16 would expect the fines were minuscule
17 compared to the profits.

18 Q. Was that a USMR document?

19 A. I presume it was, but I
20 couldn't -- there was nothing on the
21 document that told me it was a USMR
22 document.

23 Q. There's no citation to this
24 sentence. Do you recall if that document
25 was included in your references?

1 A. No, I didn't use it. I -- it's
2 not telling me anything I didn't already
3 know from other smelters, that they get
4 fined a lot and they stay in business as
5 long as the commodity business is high
6 enough and the fines are not large enough to
7 put them out of business.

8 Q. **But you're not rendering an**
9 **opinion with respect to how from an**
10 **accounting standpoint USMR treated fines;**
11 **correct?**

12 A. Oh, no. I'm just saying there
13 were fines and they were a cost of doing
14 business and there are profits.

15 Q. **And then there are costs**
16 **associated with --**

17 A. Sure.

18 Q. **-- additional pollution control**
19 **that may be necessary to comply with new air**
20 **emission requirements; right?**

21 A. Absolutely.

22 Q. **And that may be an economic**
23 **issue in this whole process?**

24 A. Absolutely.

25 Q. **Okay.**

1 All right. And so what I want
2 to do next is figure out what were the
3 analytical tools that you used to make your
4 determination that the USMR facility was the
5 primary source of lead and arsenic within
6 the proposed class area. So one of the
7 things that you did is you looked at
8 physical trends in the data; right?

9 A. (Witness nods head.)

10 **MR. GERMAN:** Yes.

11 A. Yes.

12 Q. And one of the things that you
13 did is you looked at Spearman nonparametric
14 correlation coefficients in the data; correct?

15 A. Yes.

16 Q. And you describe when you're
17 talking about the Spearman analysis a
18 sympathetic variation in the data; right?

19 A. Yes.

20 Q. And that's really another
21 description of kind of what the Spearman
22 analysis tells you?

23 A. Yes.

24 Q. Is it anything beyond that?

25 A. It tells me that to a high

1 degree of certainty that as copper goes up,
2 lead and arsenic also go up in samples.
3 It's not a hundred percent of the time, but
4 it's a significant -- the majority of the
5 time and that estimate has a high statistical
6 significance.

7 **Q. And when you use the term**
8 **sympathetic variation from a quantitative**
9 **standpoint, you're referring to the Spearman**
10 **analysis; right?**

11 A. Yes.

12 **Q. Are you referring to anything**
13 **else?**

14 A. Just looking at the data, like
15 in the table you'll notice of the plaintiff's
16 data, I went through and I marked where I
17 thought there was an elevation in copper and
18 then I looked at whether or not the arsenic
19 and the lead exceeded screening levels.

20 **Q. So those were -- those were**
21 **visual analyses --**

22 A. Visual --

23 **Q. -- against --**

24 A. Yes. But they're captured in
25 the Spearman analysis.

1 Q. So we've got these visual trends
2 that we've talked about and we've got
3 Spearman. Is there anything else that you
4 used to determine that the USMR facility was
5 the dominant source of lead and arsenic?

6 A. The statistics based on the
7 USMR, the transects and samples taken by the
8 plaintiff in the class area.

9 Q. And what do you mean by the
10 statistics?

11 A. Statistics would be like the
12 general descriptive statistics, the min, the
13 max, the mean, standard deviation, the
14 percentiles, number of exceedances for each
15 heavy metal.

16 Q. And how does that distinguish
17 between, say, for example, lead-based paint
18 versus the USMR facility?

19 MR. GERMAN: Objection. You can
20 answer.

21 THE WITNESS: Okay.

22 A. For example, lead-based paint
23 has lead in it and it doesn't have copper in
24 it to speak of and it doesn't have arsenic
25 in it to speak of, so let's just take one

1 end member. Let's say that all the
2 contamination in the class area is due to
3 lead paint. Then you would see lead
4 elevated everywhere and no copper and no
5 arsenic. You see no relationship between
6 copper content, arsenic content, lead
7 content. You go on the other side, let's
8 say the smelter just emitted copper. Then
9 you would see no lead and no arsenic. But
10 we know that the source emitted all three,
11 and so the fact that they're highly
12 correlated in soil samples is more likely
13 than not an indication that one source with
14 that signature is the source for contamination
15 over the entire class area to a reasonable
16 degree of scientific certainty.

17 **Q. I understand what you're saying,**
18 **Dr. Flowers, but I don't think that it**
19 **really answers my question. The correlation**
20 **between the elements is what's illustrated**
21 **by the Spearman correlation coefficient;**
22 **right? Correct?**

23 **A. Yes.**

24 **Q. My question really was: When**
25 **you look at the tables, the max and the min**

1 and the standard deviation, how do those
2 particular statistics lead you to the -- or
3 how do they support the conclusion that the
4 USMR smelter is the dominant source?

5 A. Because they -- the averages
6 decrease with distance away from the smelter.
7 That's what you expect. If you go to the
8 EPA, EPA says the major point of evidence
9 for smelters being point sources is that
10 decrease with distance away from the source,
11 and they look at lead and soils and I -- I
12 think it's a 1998 citation, and so you get a
13 pattern. Now, it's not entirely clear that
14 with lead paint you would get such a pattern
15 over a wide geographic area. You get some
16 houses maybe that might have a little lead
17 paint, some others might have a little more,
18 but there would be no pattern over a wide
19 geographic area. Similarly, if a brake pad
20 was dumped somewhere and somehow dissolved,
21 there might be a copper anomaly around that
22 brake pad, but it wouldn't be over a wide
23 geographic area showing the pattern of
24 decrease with distance away from the smelter.

25 Q. So it's your testimony,

1 **Dr. Flowers, that one of the criteria you're**
2 **looking at in terms of the patterns you're**
3 **searching for is a decrease in the average**
4 **concentrations with distance?**

5 **MR. GERMAN:** Objection to form.

6 You can answer.

7 A. With distance from the smelter.

8 Q. **Okay.**

9 Well, let me have you look at
10 **Table 2.**

11 A. Okay.

12 Q. And the average concentration of
13 arsenic in Table 2 is 24; is that correct?

14 A. Yes.

15 Q. For the AOC. Is that right?

16 A. Yes.

17 Q. And then if we look at Table 5
18 on page 18, that also has an average arsenic
19 concentration of 24 for outside of the AOC;
20 right?

21 A. Yes. That doesn't bother me.

22 It depends how big the plume is.

23 Q. But it doesn't show a decreasing
24 concentration in arsenic, does it?

25 A. It depends -- you have a

1 footprint. It depends where you're sampling
2 the footprint. If you're sampling pretty
3 much on top of the biggest impact area,
4 you're going to get similar numbers. They're
5 not going to match up exactly decreasing
6 with distance. There's var -- so much
7 variability in this data that, you know,
8 it's sometimes -- if you looked at the air
9 bars, you might be up on top. In other
10 words, the way I would interpret that is the
11 transects are part of the AOC.

12 Q. **Well, they're not, are they?**

13 A. Well, that's according to you
14 they're not, but to me they are.

15 Q. **Okay.**

16 **If you look at page 14 of your**
17 **report, in that first paragraph, you**
18 **reference Figure 10 of your report, which is**
19 **an evaluation of the copper with depth; right?**

20 A. Yes.

21 Q. **And --**

22 A. In the AOC.

23 Q. **In the AOC.**

24 **And you state in about the**
25 **middle of that first paragraph on page 10:**

1 It can be seen in Figure 10 that copper
2 enrichment and exceedances occur in all
3 depths as deep as 90 inches measured depth
4 below the ground surface; correct?

5 A. That's what the data shows.

6 Q. And when we were talking about a
7 conceptual site model, you indicated to me
8 that the conceptual site model that you were
9 using was an air deposition pathway; right?

10 MR. GERMAN: Objection to form.

11 A. Yes.

12 Q. And by definition, an air
13 deposition pathway means that at least the
14 initial deposition of the contaminant of
15 concern would be on the surface; correct?

16 A. Yes.

17 Q. And then you would expect that
18 the concentration, if indeed it came from
19 the air, would be highest at the surface;
20 right?

21 A. It depends when you look.

22 Q. Well, if you look at --

23 THE VIDEOGRAPHER: Doctor,
24 where's your microphone?

25 THE WITNESS: Did I lose it?

1 **THE VIDEOGRAPHER:** You lost it.

2 **THE WITNESS:** I'm running around
3 too much.

4 **THE VIDEOGRAPHER:** Just don't
5 run it over. Okay?

6 **THE WITNESS:** Okay. I'm sorry.

7 **THE VIDEOGRAPHER:** Okay.

8 A. Okay.

9 Q. So if you look, say, the next
10 day after the air emission occurs, it's
11 going to be in the surface; correct?

12 A. Sure.

13 Q. If you look the next year after
14 a lead emission, it's still going to be
15 mostly concentrated in the surface; correct?

16 A. It depends.

17 Q. It depends on what?

18 A. Depends on what's going on at
19 the site. I mean, it is -- generally what
20 you say is true, that lead would tend to lag
21 behind other contaminants, but it can be
22 mobile.

23 Q. What conditions make lead mobile?

24 A. Generally high organics make it
25 more mobile.

1 Q. **Is that the only thing that**
2 **makes it more mobile?**

3 A. Digging it up and burying it
4 might.

5 Q. **Does it depend upon what the**
6 **lead compound is?**

7 A. Well, I wouldn't -- I never
8 think of specific compounds in this case.
9 This is more imparting a lead signature to a
10 six-inch core sample.

11 Q. **Well, for example, would lead**
12 **oxide or would lead sulfite be more likely**
13 **to move through a soil column?**

14 A. Lead sulfite would weather and
15 produce sulfuric acid and that would
16 mobilize the lead more.

17 Q. **Okay.**

18 **So it's your testimony that a**
19 **lead sulfite would move more easily than a**
20 **lead oxide?**

21 A. Plus if there's SO₂ coming in
22 from the atmosphere because of the smelter,
23 there would be acid rain falling, and that
24 would enhance weathering at the surface.

25 Q. **And so it's your testimony that**

1 lead is more likely to move in soil if the
2 soils are acidic?

3 A. Yes.

4 Q. Is it your opinion that the lead
5 numbers that we see down to depths below
6 three or four feet, that those originated
7 from air deposition on the surface?

8 A. I can't tell.

9 Q. You don't know one way or the
10 other?

11 A. No, I don't. I mean, they could
12 be burial, they could be migration.

13 Q. What about lead concentrations
14 between 12 and 18 inches? Is it your
15 opinion that those predominantly came from
16 air emissions?

17 A. Again, I don't know. I haven't
18 investigated that.

19 Q. Have you investigated any other
20 sites where they looked at aerial deposition
21 of lead?

22 A. No.

23 Q. And so do you -- you don't know
24 whether what other researchers have reported
25 in terms of what the depth profile looks

1 like for an aerial deposition of a lead

2 contaminant --

3 MR. GERMAN: Objection.

4 Q. -- do you?

5 MR. GERMAN: Objection to form.

6 A. In terms of the aerial extent of
7 lead deposition, yes. As a function of
8 depth, I don't think I've done a project
9 looking at that. The only project that I've
10 done looking at really depth as a factor in
11 contaminant freight and transport is a
12 contaminated bayou where they dredged it and
13 the dredge spoil was put up on the bank and
14 originally it contained zinc and chromium
15 and lead, and pretty much in that environment
16 anyway all the zinc and chromium leached out
17 and the lead was left behind.

18 Q. So of all --

19 A. In that case.

20 Q. Of all the metals that were
21 present in that case, lead was the least
22 mobile; correct?

23 A. Right. But you have to remember
24 that that was in a highly reducing environment
25 contaminated with hydrocarbons and then it

1 was put up on a bank and was weathered,
2 leached, oxidized, etc., and the end result
3 was the lead content kept going up whereas
4 the other contaminants disappeared.

5 **Q. And are you aware that there are**
6 **a number of documents from a regulatory**
7 **standpoint where EPA generally characterizes**
8 **lead as being largely immobile in soil?**

9 A. That's not unreasonable.

10 **Q. And if you look at Figure 19 of**
11 **your report.**

12 A. Sorry. Okay.

13 **Q. If you look at Figure 19 of your**
14 **report, some of the highest concentrations**
15 **of lead are at depth; correct?**

16 A. Yes.

17 **Q. I mean, the highest numbers are**
18 **in the 6 to 12 and the 12 to 18 inch soil**
19 **intervals; correct?**

20 A. Yes.

21 **Q. And you have concentrations over**
22 **10,000 below 45 inches; correct?**

23 A. Yes.

24 Can we take a break --

25 **Q. Yes. Sure.**

1 A. -- so I can get some water?

2 Q. Yes. That will help me find
3 what I'm looking for, too.

4 A. Okay.

5 **THE VIDEOGRAPHER:** All right.

6 We are going to go off the record at
7 11:10. We'll end media 2.

8 (Whereupon, a brief recess was
9 taken.)

10 **THE VIDEOGRAPHER:** Back on the
11 record 11:15. This is media 3 in the
12 deposition of Flowers.

13 (Exhibit 550, Figure 2 from
14 Sullivan report, marked for
15 identification, as of this date.)

16 **CONTINUED BY MR. SUTHERLAND:**

17 Q. Dr. Flowers, before the break,
18 we were talking about the depth profile for
19 lead samples and the concentrations at the
20 various depth intervals. I'm going to hand
21 you a document that I've marked as
22 Exhibit 550, and this is a figure from
23 Mr. Sullivan's report for plaintiffs in this
24 case.

25 Do you recall ever seeing this

1 exhibit before?

2 A. Yes, I've seen this document.

3 Q. And it's a depth profile for the
4 lead concentrations or the mean lead
5 concentrations for the soil samples
6 collected by Arcadis; correct?

7 A. That's what it says; yes.

8 Q. And what Mr. Sullivan has
9 reported is that the two highest mean
10 concentrations for lead concentration occur
11 in the interval that's between 6 and 12
12 inches which is reported on this figure at
13 9 inches.

14 **Do you see that?**

15 A. Yes. He said the median, so. . .

16 Q. **The median?**

17 A. Yes.

18 Q. **Okay.**

19 So the median concentration
20 is highest in that 6 to 12 inch interval;
21 correct?

22 A. According to this graph, yeah.

23 Q. And the second highest median
24 concentration is at the 12 to 18 inch
25 interval; correct?

1 A. No, I don't -- maybe I'm missing
2 something. I see it somewhere below 10.

3 Q. **Well, if you look at the -- I'm**
4 **not talking about the line, but the data**
5 **points.**

6 A. I'm looking at the data points.

7 Q. **All right. If you look --**

8 A. The second data point is up near
9 300.

10 Q. **Right.**

11 A. Which is above the 2 on either
12 side.

13 Q. **Right. And that's the 6 to 12**
14 **inch interval; right?**

15 A. Oh, that's what you're calling
16 6 to 12.

17 Q. **Yeah. I mean, it reports out at**
18 **9, which is halfway --**

19 A. Okay.

20 Q. **-- between 6 and 12.**

21 A. Okay. Okay. Yes. That's okay.

22 Q. **And then the second highest**
23 **reports out at 15, which is the 12 to 18**
24 **inch interval; correct?**

25 A. Right.

1 Q. And so what Mr. Sullivan's
2 figure is showing us is that there's
3 actually greater concentrations, at least
4 according to the median, at those two lower
5 intervals; right?

6 A. Yeah. 50% of the values are
7 above, 50% are below what's plotted.

8 Q. And is it your opinion to a
9 reasonable degree of scientific certainty
10 that that particular depth profile is
11 consistent with an air deposition pathway of
12 lead?

13 MR. GERMAN: Objection to form
14 and foundation.

15 You can answer.

16 A. Well, I guess my answer is a
17 little more complicated than your question.
18 Material in the class area, and this happens
19 with all smelters, isn't necessarily
20 pristinely left where it settles from the
21 air. People dig it up, they move it around,
22 they truck it through the neighborhood, they
23 fill in stuff, and like that. The AOC in
24 particular, there are aerial photos that
25 show it completely denuded of vegetation, so

1 I don't know, you know, you could have air
2 deposition and then plow it under as a
3 possibility.

4 Q. Dr. Flowers, can you point me to
5 any document or other evidence that plowing
6 under, as you describe it, accounts for the
7 data that we see on Exhibit 550?

8 A. Again, he's using the median,
9 50% above, 50% below. I'd prefer to look at
10 the whole distribution.

11 MR. SUTHERLAND: Objection.

12 non responsive.

13 Q. Can you point me to any
14 particular document or other evidence
15 that supports your statement that plowing
16 under explains the data that we can see in
17 Exhibit 550?

18 A. No.

19 MR. GERMAN: Objection. Asked
20 and answered.

21 A. I can't.

22 Q. And you haven't done that
23 analysis as part of your report; correct?

24 MR. GERMAN: Objection.

25 A. Not yet. No.

1 **Q.** And you say not yet. Are you
2 planning to do it?

3 **A.** If I'm asked to do it, I will.

4 **Q.** And you haven't been asked so far?

5 **A.** Not so far. But I don't, you
6 know, think that you can rule out the
7 possibility of burial or airborne deposition.

8 **Q.** Okay. I mean, fair enough, you
9 can't rule it out, but you, at this point in
10 time, you can't say whether that happened or
11 it didn't happen; right?

12 **A.** I can say that in an aerial
13 photo of the AOC area, it's completely
14 denuded of vegetation and it looks like
15 there was some heavy equipment working
16 across the surface, but I don't know what
17 they were doing, whether they were digging
18 or whatever, like that.

19 **Q.** What aerial photo are you
20 referring to?

21 **A.** It's in the --

22 **Q.** Is that cited in your report?

23 **A.** It's in the '40s. No. I'm just
24 recalling it from the memory. I just don't
25 think you can be categorical about what went

1 on in the --

2 Q. Whether a particular property
3 had significant disturbances of soil like
4 the type that you have described, that would
5 be something that would happen that would be
6 unique to that particular property; right?

7 A. I don't know.

8 Q. You don't know?

9 A. No.

10 Q. Well, you wouldn't expect there
11 to be reworking of the whole proposed class
12 area in a uniform way, would you?

13 MR. GERMAN: Objection.

14 A. Not in a uniform way, but there
15 could be erosion, there could be transport,
16 there could be hauling, there could be dust,
17 there could be -- there are all kinds of
18 possibilities. This is what I've seen in
19 other smelter areas. Primary mode of
20 transport was their deposition, but then it
21 was rearranged.

22 Q. In that second rearrangement,
23 where and how that happened, that would vary
24 across the class area; right?

25 A. Different mechanisms could be

1 operating, but I don't know specifics here.

2 Q. I direct your attention to page 26
3 of your report, and if you look at that first
4 paragraph under other sources, the last two
5 sentences, maybe the last three, but the
6 last two sentences say: The solubility of
7 heavy metals is limited under neutral to
8 mildly alkaline conditions in the soil.

9 Do you see that?

10 A. Yes.

11 Q. And then you go on to say:

12 Highly acidic soils are found in New Jersey
13 when metal sulfides weather and generate
14 sulfuric acid that enhances the solubility
15 of buried metal. New Jersey has produced
16 maps showing the occurrence of acidic soils,
17 and soils in the Carteret area have a low
18 potential for acidity.

19 Did I read that correctly?

20 A. Yes.

21 Q. And so it's your opinion that at
22 least with respect to acidity promoting the
23 movement of lead within the soil column,
24 that's a low probability in Carteret; correct?

25 A. Well, the map that is produced

1 here is talking about indigenous sulfides,
2 and it doesn't treat things like sulfur
3 dioxide coming off of a smelter, acid rain
4 being produced in the vicinity of a smelter,
5 sulfides being spread across the ground,
6 weathering producing sulfuric acid, all
7 those things could mobilize metals and cause
8 them to sink deep into the ground.

9 **Q. Did you do any evaluation of the**
10 **sulfur content of soils in Carteret?**

11 A. Sulfur content in and of itself
12 would not help you. What you need -- would
13 need is measurements of pH.

14 **Q. Did you do any evaluation of the**
15 **pH of the soils in Carteret?**

16 A. No. I looked at the soil map to
17 see if there was any indigenous acidic soils,
18 and there weren't, and then everything else
19 would have been in the past.

20 **Q. And another parameter that would**
21 **be important to that evaluation would be the**
22 **buffering capacity of the soil, too; correct?**

23 A. Right.

24 **Q. And did you do any evaluation of**
25 **the buffering capacity?**

1 A. No; but I know what the soils
2 are and the soils are -- have limited
3 buffering capacity.

4 **Q. And what kind of soils are those?**

5 A. Well, you know, you have triacic
6 soils there, there's sand, silts, clays, you
7 don't have any limestone. Limestone would
8 have a high buffering and neutralization
9 capacity. The diabase doesn't have a high
10 buffering capacity. What you -- what I
11 think you're getting at is something that
12 would neutralize the acid. There's not a
13 lot in the Carteret area that would neutralize
14 acid. So I would think acid rain would be a
15 common occurrence around a smelter that was
16 smelting green sulfite concentration.

17 **Q. But you haven't done any pH
18 analysis?**

19 A. No, I haven't.

20 **Q. And you could have requested
21 that particular analysis as part of
22 plaintiff's soils in this case; correct?**

23 A. Right. But I can generally
24 predict what the answer would be.

25 **Q. You can't --**

1 A. Based on the rock type.

2 Q. **You can't say?**

3 A. I can't tell you the exact
4 number, but I can tell you whether it's
5 alkaline or acid.

6 Q. **And so do you have an opinion to**
7 **a reasonable degree of scientific certainty**
8 **as to the pH of the soils that are present**
9 **in the borough, Carteret?**

10 A. Right now? No.

11 Q. **Because you don't have the data;**
12 **right?**

13 A. No, I don't. But I know what
14 the rocks are and I know what buffering
15 capacity is and I know what acid rain is
16 and, you know, acid rain is a problem in
17 areas underlain by granitic rocks because
18 they have no buffering capacity where acid
19 rain is less of a problem in areas underlain
20 by limestone.

21 Q. **Well, Dr. Flowers, I mean,**
22 **directing you back to page 26 of your report**
23 **where other sources of potential**
24 **contaminants including metal scraps, you**
25 **dismissed those potentials because the**

1 Carteret area soils have a low potential for
2 acidity; right?

3 A. Yes.

4 Q. And so you're changing your mind?

5 A. No. I'm saying that the acidity
6 wasn't constant, it changed, it varied,
7 depended on which way the wind blew,
8 depended on whether or not it rained.

9 Q. So that's something that we
10 would have to evaluate on a property by
11 property basis?

12 A. No.

13 Q. Well, I --

14 A. You wouldn't --

15 Q. I don't -- don't understand your
16 answer then.

17 A. Well, my answer is this is a
18 larger meterological phenomenon and a
19 smelter phenomenon, it's not an individual
20 property phenomenon.

21 Q. Well, then you also go on and
22 you say on page 26 that it's not a
23 phenomenon that is important with respect to
24 other sources because the soils are
25 generally not acidic; right?

1 A. That's what you would expect
2 absent of anthropogenic effects.

3 Q. **So you're changing your mind and**
4 **you're saying --**

5 A. No, I'm not.

6 Q. **No?**

7 A. Your question was what I wrote
8 and I'm explaining what I wrote and why I
9 wrote it and that would say that generally
10 you wouldn't expect a brake pad to dissolve
11 and move over the entire class area, you
12 wouldn't expect type face to dissolve and
13 move over the entire class area, but you
14 would expect emissions from a smelter to
15 come through the air and be deposited in the
16 entire class area.

17 Q. **What you actually said on page 26,**
18 **the last section, is: Soils in the Carteret**
19 **area have a low potential for acidity.**

20 **That's what you said; right?**

21 A. According to the State of New
22 Jersey.

23 Q. **Well, this is according to you.**

24 A. No, I am looking -- I am citing
25 a reference there that takes the big picture

1 view of soils in New Jersey.

2 Q. How -- what does the pH have to
3 be to solubilize lead?

4 A. 2 maybe.

5 Q. What's a typical acidic soil pH?

6 A. Less than 4.

7 Q. pH is a long scale; right?

8 A. Sure.

9 Q. So the difference between a pH
10 of 2 and a pH of 4 is a thousand; right?

11 A. No. It's a hundred.

12 Q. Or a hundred. Okay. It's a
13 factor of a hundred.

14 A. Yeah.

15 Q. And so even if we have acidic
16 soils, the pH is still a hundred times too
17 high to solubilize lead?

18 A. In a broad geographic sense.

19 Q. Okay.

20 A. But it doesn't preclude the
21 possibility that one day some particularly
22 noxious stuff came out of the smelter that
23 was full of acid and blew across the ground
24 and then it rained and sulfuric acid fell
25 from the sky.

1 Q. And it's your testimony to a
2 reasonable degree of scientific certainty
3 that the scenario that you just described
4 explains the data that we see in Exhibit 5 --

5 A. No, it does not.

6 Q. **It does not?**

7 A. Does not.

8 Q. **Because you haven't done the work?**

9 MR. GERMAN: Objection.

10 A. No, I haven't investigated that.

11 Q. **What's more likely to move**
12 **through the soil column? A particle that**
13 **originated from a pyrological process like a**
14 **smelter or a chip of lead-based paint?**

15 MR. GERMAN: Objection to form,
16 foundation.

17 A. It depends on the particle.

18 Q. **What parameters of the**
19 **particle --**

20 A. Well --

21 Q. **-- influence that?**

22 A. -- you might have little bitty
23 bitty submicron particles that could pipe
24 their way down, not go into solution, but be
25 carried down simply physically by infiltrating

1 groundwater.

2 Q. How small would it have to be to
3 do that?

4 A. It depends on what the porosity
5 and the size of the pores are. I don't know
6 what that is.

7 Q. That would be less likely to
8 happen in a clay soil; correct?

9 A. In a clay, probably so, unless
10 there were fractures.

11 Q. And do you know whether or not
12 Carteret typically has clay soils?

13 A. The exact texture of soils varies,
14 but they didn't look like pure clay to me.

15 Q. Well, they're not sandy, are they?

16 A. No, they're not sandy.

17 Q. What other things would influence
18 whether a paint particle or a smelter
19 particle is more likely to move to deeper
20 depths?

21 A. One would be whether or not the
22 particle density, the -- whether or not the
23 particle is reactive with other particles.

24 Q. Would lead paint or lead in a
25 smelter particle tend to be more reactive to

1 **the environment?**

2 A. I would think the smelter
3 particle would be reactive. Lead paint is
4 low density, unless it was ground up really
5 fine, it might infiltrate. Again, it just
6 depends on the specifics.

7 Q. **What about the comparison**
8 **between a smelter derived particle with lead**
9 **and a pure solder ball?**

10 A. A pure what?

11 Q. **Solder, you know, the**
12 **combination of lead and tin that makes up**
13 **solder.**

14 A. Yeah.

15 Q. **Which is more likely to react in**
16 **the environment?**

17 A. Well, the smelter particle I
18 would expect to be much smaller than the
19 solder ball on the micron scale.

20 Q. **Well, what about solder balls**
21 **that are created by the -- when you're**
22 **sweating the pipe, you vaporize small**
23 **amounts of the lead and they coalesce small**
24 **balls? Do you know what the micron size of**
25 **those are?**

1 A. I don't -- I think they're
2 pretty -- if you can see them, they're big.

3 Q. Well, let me direct your
4 attention to this one, Exhibit 549.

5 A. Do I have that one?

6 Q. Yes.

7 A. It says 545. Oh, that's a 9.
8 I'm sorry.

9 Q. And if you could turn to it's
10 Bates USMR01074793.

11 A. Okay.

12 Q. And this is a PowerPoint of a
13 sample that was collected in the 0-6 inch
14 layer at 148 Carteret Avenue.

15 A. Okay.

16 Q. Do you see that?

17 A. Yeah.

18 Q. And as part of that sample, the
19 microscopy identified some very small solder
20 balls.

21 Do you see that?

22 A. I see them.

23 Q. In your opinion, would those
24 solder balls be more likely or less likely
25 to be reactive such that they move deeper in

1 **the soil column than smelter material?**

2 A. I can't tell how big they are
3 from -- just because it's 100X, I don't -- I
4 can't see the scale bar.

5 Q. **Okay.**

6 **Well, if -- assuming that they're**
7 **less than 20 microns, if they're less than**
8 **20 microns, would you expect them to be more**
9 **reactive or smelter material to be more**
10 **reactive?**

11 A. I don't know.

12 Q. **You don't know?**

13 A. (Witness shakes head.)

14 Q. **Generally, smaller particles**
15 **have larger surface area, correct, per mass?**

16 A. Per mass?

17 Q. **Yeah.**

18 A. Yeah. They -- generally the
19 smaller the particle, the greater the
20 surface area.

21 Q. **And that is --**

22 A. But it depends what the particle
23 is.

24 Q. **Right. I mean, if it has**
25 **porosity, that may or may not be true, I**

1 guess; correct?

2 A. Sure.

3 Q. **But as a general matter, the**
4 **greater the surface area, the more potential**
5 **that the material has to react in the soil**
6 **environment?**

7 A. Potential; yes.

8 Q. **And is it also true that some**
9 **types of particles, particularly vitrified**
10 **particles, are less reactive because of**
11 **their physical structure?**

12 A. They can be less reactive; yeah.

13 Q. **And the pyrological emissions**
14 **from a facility like a smelter will tend to**
15 **be a vitrified particle; right?**

16 A. It depends on the rate of
17 cooling and the composition. I can't make a
18 blanket statement. They're generally
19 spherulitic, but they could be partially
20 crystallized, partially glass.

21 Q. **But frequently they are --**
22 **they're vitrified to at least some extent;**
23 **correct?**

24 A. I would say that it's not
25 uncommon to find glass in them.

1 Q. Have you found an evaluation in
2 this case to determine whether or not the
3 particles that emanated from the USMR smelter
4 were vitrified or not?

5 A. No. There's no samples that
6 exist.

7 Q. Have you done any evaluation to,
8 looking at the soil samples, to determine
9 whether or not there are vitrified spheru --
10 I can't say it -- spherulitic, how do you
11 say it?

12 A. Spherulitic.

13 Q. Spherulitic particles present?

14 A. No, I haven't.

15 Q. You've done that in other cases;
16 right?

17 A. Yes.

18 Q. I mean, for example, we were
19 talking about that case in Pennsylvania, the
20 coal burning power plant.

21 A. Shipping Port; yes.

22 Q. One of the things you did is you
23 looked at the wipe samples and soil samples
24 and identified each of the particles; right?

25 A. Right.

1 Q. But you didn't do that here?

2 A. No. I didn't need to do that
3 here.

4 Q. Turn back to your report again,
5 page 16.

6 In this paragraph, you describe
7 that -- the transwidth distance that we
8 talked about briefly earlier this morning
9 that you saw in the soil data; correct?

10 A. Yes.

11 Q. And you reference figures -- I
12 think Figure 12 is the figure that describes
13 copper, Figure 15 is the one for arsenic and
14 Figure 20 is the one for lead.

15 A. Okay.

16 Q. Is that right?

17 A. Yeah.

18 Q. All right. Well, let's look at
19 arsenic first, so let's go and look at
20 Figure 15. I think it's -- yeah, Figure 15B.

21 A. Yes.

22 Q. And it's your testimony to a
23 reasonable degree of scientific certainty
24 that Figure 15B shows a downward trend in
25 the arsenic concentration; correct?

1 A. Yes.

2 Q. And that's based upon your
3 visual observation of this data, it tells
4 you that the trend is going downwards?

5 A. Yes.

6 Q. Do you understand, Dr. Flowers,
7 that there's general agreement I think among
8 the experts that there is a downward trend
9 in the data within the AOC? Do you understand
10 that?

11 A. Yes.

12 Q. But it's your opinion that that
13 downward trend continues into the AOC and
14 continues into the area where the plaintiff
15 took samples; correct?

16 A. Right. My opinion is that the
17 AOC is too small.

18 Q. Well, and I'm not asking about
19 remediation or anything else like that. I'm
20 just focusing in on your opinion about the
21 trend.

22 A. Okay.

23 Q. And as I understand, where the
24 difference occurs between what the
25 defendants' experts are saying and what

1 you're saying is the defendants' experts are
2 saying, you know, there's no longer a trend
3 with distance, once you get outside of the
4 AOC, you're probably -- or even shortly
5 before, even before you get to the boundary,
6 shortly before the boundary in the AOC, but
7 what you're saying is no, that trend
8 continues even outside of the AOC; right?

9 A. Yes. And the reason I say that
10 is that, you know, a smelter plume, you can
11 use the mathematical function and draw it
12 and take a cross-section through it and it
13 will decrease with distance in a regular
14 way. In reality, things don't happen that
15 way. I think slopes from the AOC to the
16 transects are completely unreliable, changes
17 in slope as a demarcation, that's a
18 completely unreliable practice because the
19 materials in a smelter plume are subject to
20 natural forces, it's not a mathematical
21 function, and although they may show that
22 general trend, the trend's not going to be
23 necessarily perfect.

24 Q. Dr. Flowers, you told me this
25 morning you're not an air modeling expert;

1 right?

2 A. I'm not an air modeling expert,
3 but I can look at contours on a plume and
4 tell you that there are certain directions
5 you can cut through that plume with where
6 the emissions just remain constant.

7 Q. And you're not an expert on
8 meteorology either, are you?

9 MR. GERMAN: Objection.

10 A. I teach weather and climate.

11 I'm not a weather forecaster.

12 Q. So you're not really -- you're
13 not really -- you don't have the expertise
14 to render an opinion on how the dispersion
15 of air contaminants occurs within the
16 Carteret proposed class area, are you?

17 MR. GERMAN: Objection.

18 A. I would say that it has nothing
19 to do with meteorology or air modeling or
20 anything, it's based on the soil data and
21 the fact that a plume in a natural setting
22 does not necessarily conform to rigid
23 expectations. There can be highs that are
24 displaced from the source, for example. We
25 see that in volcanic eruptions all the time.

1 It depends on what's going on in nature as
2 this stuff is dispersed out into the
3 atmosphere.

4 Q. Have you done any quantitative
5 or even semi-quantitative analyses that
6 would suggest that there are hot spots or
7 higher concentration as a result of
8 historical air emissions that are far away
9 from the USMR smelter?

10 A. Well, if you -- I can only look
11 at the data that we have, and if you look at
12 all the different distance plots, you'll
13 find some where all three metals jump up off
14 trend. Trend has a lot of variation in it.
15 That's why they have to be plotted in logged
16 space. So the fact that you find a high
17 value away from a smelter doesn't surprise
18 me at all.

19 Q. Well, another explanation for
20 the high value away from the smelter is that
21 it came from another source; right?

22 A. If it's got all three metals in
23 it, it's hard to embrace that alternate
24 source theory.

25 Q. The answer to my question though

1 is if another explanation -- assuming that
2 the source or multiple sources contain those
3 metals, another explanation is it came from
4 those alternate sources?

5 **MR. GERMAN:** Objection.

6 A. Not necessarily.

7 Q. **So that's not possible?**

8 A. I'll tell you what's not
9 possible, is to have --

10 Q. **Can you answer my question?**

11 **MR. GERMAN:** Allow him to.

12 A. I'm trying to.

13 Is to have a confluence of
14 multiple sources come together in the right
15 place and give the pattern that we see in
16 this plume. That's a very low probability
17 occurrence. So you need to deliver to a
18 specific site from an alternate source, you
19 need to deliver copper, you need to deliver
20 arsenic, you need to deliver, more often
21 than not, lead in the relative abundance
22 that we observe on average in the plume, and
23 with alternate sources, that's -- so it's
24 low probability that that would occur over
25 the entire class area that I rejected that

1 hypothesis.

2 Q. Okay. All right.

3 So it's your testimony to a
4 reasonable degree of scientific certainty
5 that where we have one of these properties
6 that's anomalous in terms of jumping up, as
7 you explained it, based upon your analysis,
8 you cannot explain those with some
9 combination of alternate sources, and that's
10 true for every single one of those properties?

11 MR. GERMAN: Objection. You can
12 answer.

13 A. Again, I did not look at it as a
14 parcel by parcel analysis.

15 Q. You didn't do any specific
16 parcel analysis --

17 A. No.

18 Q. -- did you?

19 A. No.

20 Q. And you didn't do any evaluation
21 of, you know, the various parameters that
22 you can use to characterize individual
23 properties such as the boring logs and other
24 things that are available from the field
25 notes that give you indications as to the

1 history of that property; right?

2 MR. GERMAN: Objection.

3 A. No, I didn't need to.

4 (Exhibit 551, Figure 15 from Dr.
5 Flowers' report, marked for
6 identification, as of this date.)

7 Q. I hand you what I've marked as
8 Exhibit 551. This is -- what I did is I
9 took your Figure 15, Dr. Flowers, and all I
10 did was I blew it up so it's a little bit
11 easier to see and then I blanked out the
12 blue data, so all of the AOC samples are
13 removed.

14 Do you see that?

15 A. Yes.

16 Q. And is it your testimony to a
17 reasonable degree of scientific certainty
18 that with respect to the remaining red data
19 that we can see on this Exhibit 551 there's
20 a downward trend in that data?

21 A. Yes.

22 Q. Okay.

23 You can see that trend?

24 A. I can see it.

25 MR. GERMAN: I just want to

1 object to your characterization of what
2 you've done to the exhibit. Dr. Flowers
3 could testify whether it matters or
4 not, but not all -- it appears to me
5 not all of the red data remains in
6 Exhibit 551 and some of the blue data
7 remains in Exhibit 551.

8 **Q. Do you have enough information**
9 **and did you understand my question with**
10 **respect to whether or not there's a downward**
11 **trend in the red data?**

12 A. Yes.

13 **Q. And then you see the -- that**
14 **sort of green oval that's put around that**
15 **data that's about .9 mile distance?**

16 A. Yes.

17 **Q. Do you know whether all of that**
18 **data is for the same property or not?**

19 A. No, I don't.

20 **Q. You didn't do any individual**
21 **analyses?**

22 A. No, I didn't.

23 **Q. And so you don't know what the**
24 **particular history is, if indeed that is one**
25 **property, what the history of that property**

1 is; right?

2 A. No, I don't.

3 Q. **Were you using that particular**
4 **set of data in your evaluation of whether or**
5 **not there's a downward trend here?**

6 A. Yes. I would consider those
7 outliers to the trend.

8 Q. **So the trend exists**
9 **notwithstanding -- even if you take those**
10 **data points out?**

11 A. Yeah.

12 Q. And I want to direct your
13 attention to Figure 20B, and Figure 20B is
14 your trend plot for lead; correct?

15 A. Yes.

16 Q. And you've indicated in your
17 report that you can observe a downward trend
18 in that data, too; correct?

19 A. Yes.

20 Q. And it's your opinion that that
21 downward trend extends into the samples that
22 are colored red on the figure; correct?

23 A. Yes.

24 (Exhibit 552, Figure 20B, marked
25 for identification, as of this date.)

1 Q. I'm handing you a document that
2 I've marked as Exhibit 552.

3 A. You're going to --

4 Q. Yes. That one.

5 A. Okay.

6 Q. And I've done something similar
7 here, I've taken out the blue data, which is
8 the data within the AOC, and then I've drawn
9 a green box around the data from
10 approximately .6 miles to 1 mile and then
11 I've drawn a red box around the data from
12 approximately 1 mile to 1.6 miles.

13 Do you see that?

14 A. Yes.

15 Q. Do you know what the difference
16 in housing age is between the properties
17 contained in the green box versus the
18 properties contained in the red box?

19 A. Not specifically.

20 Q. Would you be surprised to know
21 that the median -- the difference in the
22 median of those houses is over 30 years?

23 A. Which way?

24 Q. The houses in the red box are 30
25 years newer than the houses in the green box.

1 A. That would be consistent with
2 the development of Carteret.

3 Q. And are you also aware that it
4 has been repeatedly demonstrated in the
5 scientific literature that lead soil
6 concentrations are heavily correlated to the
7 age of the house?

8 MR. GERMAN: Objection. You can
9 answer.

10 A. Particularly if they were built
11 after the ban on lead paint occurred.

12 Q. So is it your testimony that
13 there is no difference in the impact on soil
14 lead from houses between, say, 1920 and
15 houses from 1950?

16 MR. GERMAN: Objection. You can
17 answer.

18 A. I think lead paint was still
19 being used in 1950.

20 Q. So you would expect that the
21 lead concentrations for houses built in 1950
22 to have similar lead concentrations to those
23 built in 1920?

24 MR. GERMAN: Objection. You may
25 answer.

1 A. I don't know. It depends what
2 kind of paint was used.

3 Q. **You haven't done that kind of**
4 **evaluation?**

5 A. No, I haven't done that.

6 Q. **And as far as you know, you**
7 **cannot make a general determination with**
8 **respect to the potential for lead-based**
9 **paint to impact soil concentrations based**
10 **upon the difference between a house built in**
11 **1920 versus one built in 1950; is that right?**

12 MR. GERMAN: Objection. You can
13 answer.

14 A. No, I can't.

15 Q. **You would agree with me that**
16 **Figure 20 does not control for housing age;**
17 **right?**

18 A. No, it doesn't.

19 (Exhibit 553, Distributions of
20 Soil Lead in the Nation's Housing Stock
21 May 1996, marked for identification, as
22 of this date.)

23 Q. I'm handing you a document that
24 I've marked as Exhibit 553. Have you ever
25 seen that document before, Dr. Flowers?

1 A. No.

2 Q. Exhibit 553 is entitled
3 **Distributions of Soil Lead in the Nation's**
4 **Housing Stock; correct?**

5 A. Yes.

6 Q. And it's a U.S. Environmental
7 Protection Agency document dated May 1996;
8 correct?

9 A. Yes.

10 Q. And I'll direct your attention
11 to the Executive Summary, and for the record
12 it's not the entire document, just I didn't
13 want to kill too many trees. The Executive
14 Summary, the first sentence states: The
15 primary objective of this study was to
16 supplement the prior reports on the national
17 survey of lead-based paint and housing
18 through additional data analyses specifically
19 focusing on the relationship between lead
20 and exterior soil, a potential source of
21 lead hazard in homes with housing unit
22 characteristics.

23 Do you see that?

24 A. Yes.

25 Q. And then if you flip over to the

1 next page under Private Housing, the first
2 sentence states: The strongest statistical
3 predictor soil lead was found to be the
4 building age.

5 Do you see that?

6 A. Yes.

7 Q. And then the second -- skipping
8 one sentence, the next sentence reads: For
9 private housing units, soil lead around
10 homes built before 1940 were significantly
11 greater than lead in soil around homes built
12 between 1960 and 1979; correct?

13 A. Right.

14 Q. And that would suggest that the
15 potential for lead impacts on properties
16 within, going back to Exhibit 552, if I'm
17 correct, is much higher in the green box
18 than it is in the red box; right?

19 MR. GERMAN: Objection. Form,
20 foundation.

21 A. There is a complication here in
22 the fact that this study presumably was not
23 in the presence of a copper smelter.

24 Q. Well, I understand that, but in
25 terms of the potential for impact from lead-

1 based paint, if we're just focusing on that
2 factor as a potential source of lead, what
3 Exhibit 553 tells you is that that potential
4 is much greater for the properties in the
5 green box than it is for the properties in
6 the red box?

7 **MR. GERMAN:** Objection.

8 A. I don't think that's what it
9 tells you.

10 **Q.** **Why not?**

11 A. Because there's no smelter
12 present here.

13 **Q.** I'm just asking about the
14 potential for lead-based paint. I'm not
15 asking about the smelter.

16 A. Regardless of what you're
17 asking, there is a smelter here.

18 **Q.** **You can't answer my question --**

19 A. No, I can't.

20 **Q.** **You can't?**

21 A. No. Not with the smelter present.

22 **Q.** **Okay.**

23 A. No.

24 **Q.** **Fair enough.**

25 **You can't tell me whether or not**

1 the potential for lead-based paint impacts
2 is greater in housing built in 1920 versus
3 housing built in 1950, that's something that
4 you can't tell me?

5 A. If you --

6 **MR. GERMAN:** Objection.

7 A. -- asked me the question in New
8 Orleans, I can answer the question.

9 Q. All right. What's the answer in
10 New Orleans?

11 A. In New Orleans, the older houses
12 have a greater potential for lead-based
13 paint in soil.

14 Q. And that same conclusion cannot
15 be applied in Carteret, is that what you're
16 telling me?

17 A. Not in the presence of a smelter.

18 Q. Okay.

19 Did you do -- for Figures 12, 19
20 and 20, did you do any sort of best fit
21 calculation?

22 A. No, I didn't.

23 Q. And I think you --

24 A. I considered --

25 Q. Go ahead.

1 A. I considered that a vacuous
2 enterprise.

3 Q. **And you felt like that your own**
4 **visual interpretation of the data was more**
5 **accurate than a best fit line?**

6 **MR. GERMAN:** Objection. You can
7 answer.

8 A. I considered that there's so
9 much scatter in the data that the quality of
10 the fit would be dubious, and so I used a
11 visual examination.

12 Q. **And in your mind, a visual**
13 **examination under those circumstances is**
14 **more reliable than a best fit line?**

15 A. With this data, yes.

16 Q. **And I think you told me before,**
17 **you didn't run a Mann-Kendall test; correct?**

18 A. No.

19 Q. **Did you do any kind of variogram**
20 **analysis?**

21 A. No, I didn't. You would have to
22 have -- variograms are for this type,
23 referring to Exhibit 21, generally are used
24 with kriging where you're contouring, where
25 you're trying to interpolate between data

1 points.

2 Q. That's your testimony, the only
3 use of a variogram is --

4 A. No. But that's generally where
5 it comes into play.

6 Q. Aren't variograms frequently
7 used to determine whether there's any
8 directionality in the data?

9 A. That's what a contour map tells
10 you also.

11 Q. Well, isn't that what you're
12 trying to determine with Figures 12, 15 and
13 20, that there's a direction in the data
14 that it decreases; right?

15 A. No. This is just distance, any
16 compass distance.

17 Q. But the conclusion that you drew
18 from Figures 12, 15 and 20 was that the
19 concentrations were decreasing with distance?

20 MR. GERMAN: Objection to form.

21 A. The distance is varying
22 directions. Kriging and variograms are used
23 to predict in geographic directions like to
24 the north, to the south, to the west. These
25 diagrams are simply as the crow flies, how

1 far is the sample from the smelter in all
2 directions geographically.

3 Q. Well, wouldn't you expect that
4 if your conceptual site model is correct,
5 that you would have a decreasing trend in
6 concentration along a particular transect?

7 MR. GERMAN: Objection. You can
8 answer.

9 A. You may or may not. It depends
10 where the transect is located.

11 Q. Well, if the transect origin is
12 at the USMR facility and it projects outward
13 in a consistent ordinal direction, wouldn't
14 you expect to have a decreasing trend?

15 A. Not necessarily.

16 Q. What's your basis for that
17 statement?

18 A. Well, I mean, it wouldn't be
19 necessarily strictly decreasing. It would
20 be high near the smelter and it would
21 decrease, but it could keep going at a very
22 low level for a long distance. It depends
23 how big the plume is.

24 Q. Well, wouldn't you expect a
25 directional variogram to identify that trend?

1 A. It might if you had complete
2 sampling of the plume.

3 Q. **But you didn't do that?**

4 A. There aren't the samples.

5 Q. **There's not enough soil**
6 **samples --**

7 A. No.

8 Q. **-- to make that determination?**

9 A. No. Absolutely not.

10 Q. **How many samples do you need?**

11 A. Well, first you need a
12 geographic distribution, if you want the
13 whole plume.

14 Q. **I don't want the whole plume. I**
15 **want to know if there's directionality**
16 **within the geographic area that we have**
17 **sample from. How many samples within that**
18 **1.6 miles or so that we have samples, how**
19 **many samples do I need to run a variogram?**

20 A. I don't know what -- I haven't
21 done it, so I can't answer that question.

22 Q. **Well, you said you didn't have**
23 **enough samples. On what basis --**

24 A. No. What I --

25 Q. **-- did you determine that?**

1 **MR. GERMAN:** Objection.

2 A. No. That is not correct.

3 **MR. GERMAN:** Objection to form.

4 A. What I said is if we're looking
5 at the entire plume, we don't have enough
6 samples.

7 Q. Okay. Well, let me ask the
8 question this way. Do we have enough
9 samples on any one of the three transects
10 that all of the people have been looking at
11 as far as the data goes to do a directional
12 variogram along that transect?

13 **MR. GERMAN:** Objection. You can
14 answer.

15 A. With respect to discerning the
16 general trend of a decrease of distance, we
17 have enough samples.

18 Q. But you didn't do that?

19 **MR. GERMAN:** Objection.

20 A. Not with a variogram.

21 Q. All you did was look at the data?

22 **MR. GERMAN:** Objection.

23 A. I looked at the data.

24 Q. Okay.

25 A. But the data trumps potentially

1 the variogram.

2 Q. Well, the variogram evaluates
3 the data, too; right?

4 A. Of course.

5 Q. And so what you're saying is
6 that your visual interpretation trumps the
7 variogram?

8 MR. GERMAN: Objection.

9 A. No. I have to see the
10 variogram. I haven't seen any of this
11 stuff. I don't know what you're talking
12 about.

13 Q. All right. Well --

14 A. What specifically was done?

15 Q. Let me direct your attention to
16 Exhibit 547. This is the Geosyntec
17 presentation.

18 A. Again, I have not reviewed this.

19 Q. But you have reviewed the
20 Newfields PowerPoint.

21 A. No, I haven't.

22 Q. You haven't?

23 A. No.

24 Q. You do have them. They are in
25 your reference materials.

1 A. I know, but I've told you
2 already I haven't reviewed them.

3 Q. Okay.

4 And if you look starting on

5 Bates USMR01074703 --

6 A. Yes.

7 Q. -- there's some variograms for
8 the AOC data.

9 Do you see that?

10 A. Yes.

11 Q. So within the AOC they run
12 variograms and the first one is for copper
13 and it actually shows based upon the
14 variogram that there is a trend with
15 distance within the AOC.

16 Do you see that?

17 MR. GERMAN: Objection. You can
18 answer.

19 A. Okay. Distance feet. What is
20 the units on the X axis?

21 Q. I think it's feet times 10 to
22 the third.

23 A. And feet is increasing to the
24 right?

25 Q. Increasing to the right.

1 A. From the smelter?

2 Q. **Yes.**

3 A. Well, this shows the opposite
4 pattern. It shows it low by the smelter and
5 getting higher away from the smelter, if I'm
6 interpreting correctly.

7 Q. **Have you used variograms in your
8 work before, Dr. Flowers?**

9 A. I used -- there is a variogram
10 underneath this, but I used the defaults. I
11 didn't mess with it for this contour map on
12 Figure 21.

13 Q. **Okay.**

14 A. Because the variogram tells it
15 how the variable varies with geographic
16 distance.

17 Q. **Right. And I don't -- I don't
18 think the Y axis is concentrations on Bates
19 1074703.**

20 A. Maybe it isn't.

21 Q. **I think it's a statistical
22 parameter.**

23 A. Yeah.

24 Q. **And as I understand it, an
25 increasing line on a variogram indicates**

1 **directionality in the data.**

2 A. Okay. So what this is saying,
3 according to you, is that there's more
4 directionality further away from the
5 smelter?

6 Q. No. It just -- I think a
7 constant slope or a slope of this type just
8 means directionality, period. I'm not
9 certain that it does.

10 A. I think there is directionality
11 in the data. I'm not --

12 Q. **Within the AOC?**

13 A. I'm thinking the whole class area.

14 Q. Well, I guess what I'd like to
15 point out to you is that if you compare the
16 AOC copper variogram, which is on Bates 703 --

17 A. Right.

18 Q. -- to the directional variograms
19 for copper on the transects, which is at
20 711 --

21 A. Okay.

22 Q. -- and they're kind of small, so
23 they're a little hard to see, you see what
24 I've referred -- what's been explained to me
25 are what's called hole-effects.

1 A. Yes.

2 Q. Which means it's a random
3 distribution.

4 **MR. GERMAN:** Objection.

5 A. Yeah, but I see no problem with
6 that at distance away from the smelter.

7 Q. So you don't -- you would not
8 expect once you get into the transects to be
9 able to see a trend with distance on the
10 variograms; is that right?

11 **MR. GERMAN:** Objection.

12 A. What I'm saying is that as you
13 move away from the smelter, the signal
14 degrades. The signal is strongest right
15 near the smelter and it degrades away from
16 the smelter, and then as you go really far
17 away from the smelter, the signal drops
18 below background.

19 Q. And so is it your testimony then
20 that at least using variograms as a tool,
21 that you would not be able to see what you
22 refer to as the decreasing concentrations
23 with distance once you get outside of the
24 AOC?

25 **MR. GERMAN:** Objection.

1 A. No. That's not my testimony.
2 You still see a decrease along the western
3 edge --

4 Q. **But do you --**

5 A. -- of the class area.

6 Q. **But do you --**

7 A. It's less than near the smelter.

8 Q. **That's true with -- that's your**
9 **testimony that that's true with respect to**
10 **arsenic?**

11 A. Sure. It decreases. It doesn't
12 decrease as much as, say, copper, but it --
13 they still decrease. Lead is lower, the
14 number of exceedances are lower. Copper is
15 the one that sticks around.

16 Q. **Well, I mean, we talked about --**

17 A. I mean arsenic. Arsenic is the
18 one that sticks around.

19 Q. **Well, I mean, we talked about it**
20 **earlier today that we looked at the AOC and**
21 **we looked at outside the AOC and the average**
22 **concentration of arsenic was the same, it**
23 **was 24 ppm per --**

24 **MR. GERMAN:** Objection. You can
25 answer.

1 A. Yes. But I think they're up on
2 top, you're up in the major impact zone of
3 the smelter.

4 **Q.** **I don't understand your answer.**

5 A. Well, okay. Think of it this
6 way. This is the smelter. Here's the
7 impact. It's way, way up here. It's
8 bobbing around because there's variability.
9 And then it starts to fall off at some rate
10 and then it comes off end into the tail and
11 the tail just keeps going.

12 **Q.** **That's your --**

13 A. It doesn't go to zero.

14 **Q.** **That's your testimony as to the**
15 **shape of the impact that you would expect**
16 **from the smelter?**

17 A. Sure.

18 **Q.** **And --**

19 A. I would not expect it to go to
20 zero.

21 **Q.** **And it's your testimony that**
22 **what you just described in terms of the**
23 **shape of the K-curve that the AOC arsenic,**
24 **average concentration of 24 ppm, that makes**
25 **sense compared to the further out average**

1 arsenic concentration of 24 ppm in the
2 transects in the plaintiff's samples?

3 **MR. GERMAN:** Objection.

4 A. Well --

5 Q. **Is that right?**

6 A. Particularly when you consider
7 all three metals.

8 Q. **All right.**

9 A. And, in fact, they're correlated.

10 Q. **Okay.**

11 Now, looking at -- and I'm not
12 sure if I did this with your new report, so
13 let me make certain. Looking at Figure 16
14 where you've got your contour map for arsenic.

15 A. Yes.

16 Q. You did not evaluate any of the
17 transects in plaintiff's data in connection
18 with that figure; right?

19 A. No.

20 Q. And the same thing is true with
21 respect to Figure 21 for lead; correct?

22 A. Anything for the AOC is just the
23 AOC.

24 Q. And so both Figure 16 and 21
25 don't tell us anything with respect to what

1 contours we might expect out in the transects
2 of the plaintiffs' sample area; correct?

3 A. No, they do not tell you anything.

4 Q. On Figure 16, you identified a
5 linear feature that's just northeast of the
6 parking lot.

7 A. Yes.

8 Q. Did you do any evaluation of
9 those particular samples that are within
10 that linear feature?

11 A. There's a table in the report
12 that summarizes -- I selected them by
13 intersecting a polygon with the data which
14 is a point layer with a polygon that I made
15 around this feature, and then somewhere in
16 the set of tables there's a set of summary
17 statistics.

18 Q. Is it your testimony that the
19 impacts that you can -- are associated with
20 that linear feature that we can see in
21 Figure 16 are as a result of aerial
22 deposition of particulate from the USMR
23 facility?

24 A. I don't know what they're from.

25 Q. So in that particular case, you

1 **don't know what the --**

2 A. I think they would be impacted
3 by aerial deposition. It would be -- they
4 look like a ditch.

5 Q. **Do you know whether or not those**
6 **particular samples in that linear feature**
7 **were impacted by the placement of non-native**
8 **fill material?**

9 **MR. GERMAN:** Objection. You can
10 answer.

11 A. Not with the -- if you look at
12 the statistics on Table 4, page 16, the
13 maximum copper is 19,000, the average is
14 3,750, and then when you go to lead, it's
15 21,000 is the max and the min -- the average
16 is 3,436, and then arsenic, 605 is the max
17 and 135 is the average. These are some of
18 the highest values observed in the AOC.

19 **MR. SUTHERLAND:** Objection.
20 non responsive.

21 Q. **My question was: Do you know**
22 **whether or not the samples that were**
23 **collected from this area, whether they were**
24 **as a result of air deposition or whether**
25 **they're as a result of non-native fill**

1 material?

2 A. They are not native fill
3 material, I guarantee you.

4 Q. **I said non-native fill material.**

5 A. Non-native. That's what I'm --

6 Q. **You're guaranteeing me they are**
7 **not --**

8 A. I'm guaranteeing you they are
9 not. They are not paint chips, they are not
10 leaded gasoline, they are not pesticides.
11 They are connected to that smelter.

12 Q. **Could they be slag?**

13 A. Sure, they could be any kind of
14 material, but they're always being impacted
15 by air fall. They're right next to the
16 smelter.

17 Q. **Well, I mean, my -- I guess**
18 **maybe I wasn't clear with my question,**
19 **Dr. Flowers, but I'm including within**
20 **non-native materials things like slags and**
21 **other sort of waste materials like, you**
22 **know --**

23 A. From where?

24 Q. **From anywhere.**

25 A. No. These are slags from the

1 site, from the USMR site if they're in there.

2 Q. And so how do you know that?

3 A. Because they're enriched in
4 copper, arsenic and lead --

5 Q. Is it your --

6 A. -- to an extreme degree.

7 Q. Is it your testimony,
8 Dr. Flowers -- or let me ask this another way.

9 What evaluation have you done of
10 other industrial sources located in the
11 immediate vicinity to the USMR facility that
12 generated solid waste materials that may
13 have been used as fill that contained
14 arsenic, copper and lead?

15 A. I haven't done that.

16 Q. And so you can't say as you sit
17 here today whether or not, assuming that
18 these are non-native waste materials that
19 were put there, you can't say whether they
20 came from the USMR facility or some other
21 industrial facility in the immediate
22 vicinity, can you?

23 A. It is my opinion that they came
24 from the USMR facility, and I can say that.
25 You have a feature that is emanating from

1 the site, the most logical, greater
2 preponderance of evidence, if you will, and
3 its signature geochemically says it's from
4 the site.

5 **Q. What do you mean by its signature**
6 **geochemically?**

7 A. What I read from you in Table 4.
8 It is 19,000. It's over 1% copper.

9 **Q. What if --**

10 A. And there's a copper smelter 10
11 feet away.

12 **Q. Well --**

13 A. And so you're trying to tell me
14 that it was a plant 40 miles up the road
15 that hauled the slag here and dumped it in
16 this ditch right next to the smelter?

17 **Q. Dr. Flowers --**

18 A. Which is more likely?

19 **Q. Dr. Flowers, what if there's**
20 **another copper smelter two miles away?**

21 A. There is?

22 **Q. I'm asking, what if there is one?**

23 A. I don't know of one two miles
24 away.

25 **Q. If there is one two miles away,**

1 then the slags -- I mean, it's less likely,
2 I'll give you that, but, I mean, once you
3 put the slags in a truck, you know, there's
4 not a huge difference between a quarter of a
5 mile and two miles, is there?

6 **MR. GERMAN:** Objection to the
7 form and foundation.

8 A. I have no way of knowing if
9 there was a smelter -- copper smelter
10 equivalent in size to the USMR two miles
11 away from it.

12 **Q.** **Does it have to be --**

13 A. And whether or not they would
14 accept waste from another -- they got their
15 own waste problems. They don't want any
16 extra waste.

17 **Q.** **Is it your testimony that the**
18 **sample that we have been talking about in**
19 **this linear feature was on the smelter site?**

20 A. No. It's not on the site itself.
21 It's emanating from the smelter site.

22 **Q.** **And do you have an opinion -- I**
23 **just want to make sure -- we've talked about**
24 **this before, but do you have an opinion as**
25 **to whether or not that linear feature is as**

1 a result of air deposition or if it's as a
2 result of the placement of waste materials?

3 **MR. GERMAN:** Objection. You can
4 answer.

5 A. I don't know.

6 **Q.** You don't know one way or another?

7 A. I think it's both.

8 **Q.** And how would you answer that
9 question?

10 **MR. GERMAN:** Just did.

11 **MR. SUTHERLAND:** No.

12 **Q.** How would you answer the question
13 of whether it came from air deposition or
14 whether it came from waste materials?

15 **MR. GERMAN:** You can answer.

16 A. I think you would have to do a
17 complete sampling of the linear feature,
18 you'd have to look at it and see what's in it.

19 **Q.** And how would you go about seeing
20 what's in it? What particular analyses
21 would you do?

22 **MR. GERMAN:** For that ditch?

23 **MR. SUTHERLAND:** For -- to
24 distinguish between air deposition and
25 waste materials.

1 A. The size of the particles. If I
2 saw globules --

3 **MR. GERMAN:** Object --

4 **MR. SUTHERLAND:** Let him answer.

5 **MR. GERMAN:** No. I want to get
6 my objection on the record because I
7 don't know if you're talking about
8 ditch or you're talking generally or
9 you're talking about class area, so I
10 want to know what question he's
11 answering.

12 **Q.** I'm talking about the linear
13 feature, and I want to know what analytical
14 tools would you use to distinguish between
15 air particulate emissions and the disposal
16 of waste materials.

17 **MR. GERMAN:** Objection. You can
18 answer.

19 A. You would look at what's in the
20 ditch.

21 **Q.** And what specific analytical
22 tools would you use to look at what's in the
23 ditch?

24 A. I think with these kind of
25 numbers, I might take the soil and sieve it

1 to try to extract particulates from it and I
2 might look at them under a microscope.

3 Q. So you would look at, for
4 example, the size of the particles would be
5 one thing; right? Correct?

6 A. Sure.

7 Q. And because you would expect air
8 particles to be smaller than waste particles;
9 right?

10 A. Maybe, maybe not, that close to
11 the smelter.

12 Q. You would also look at the
13 morphology of the particles or the pieces?

14 A. Yeah.

15 Q. Would you look at the chemical
16 composition of the pieces?

17 A. Yeah. But I wasn't tasked to do
18 that.

19 Q. Okay.

20 A. In fact, I didn't know this
21 thing existed until I contoured it.

22 Q. Okay.

23 Did you look, once you figured
24 out that it existed, did you look at the
25 boring logs?

1 A. No.

2 Q. Would the boring logs have given
3 you any useful information in determining
4 whether or not the material was a waste
5 material or whether it was as a result of
6 air emissions?

7 A. They might have, but I haven't
8 done that yet. I may be asked to do that.

9 Q. Do you know if the microscopy
10 work that was given to you at Exhibit 549
11 includes some microscopy work of the material
12 that was removed from this linear feature?

13 A. No. I don't know that.

14 Q. Would that have been helpful to
15 you to have some microscopy analysis in
16 determining whether or not this linear
17 feature was as a result of air emissions
18 deposition or placement of waste materials?

19 **MR. GERMAN:** Objection.

20 A. Again, I wasn't asked to do that.
21 I was asked to say whether or not the
22 smelter impacted areas, and it clearly
23 impacted this area, so I didn't need -- the
24 chemical analyses were sufficient to tell me
25 that it had been impacted.

1 **Q.** Well, wasn't part of your
2 assignment to specifically look at the air
3 deposition conceptual site model?

4 **A.** It was to look at --

5 **MR. GERMAN:** Objection.

6 **A.** -- the conceptual site model,
7 the licensed mediation specialist says the
8 predominant way of transport is air
9 deposition, Arcadis says the predominant way
10 of transfer waste into the class area is air
11 deposition, and I agree with them.

12 **Q.** But you didn't --

13 **A.** That's not to say that other
14 things didn't happen.

15 **Q.** Okay.

16 **And in this case, this linear**
17 **feature may be one of those locations where**
18 **other things happened; right?**

19 **A.** Sure.

20 **Q.** Okay.

21 **MR. SUTHERLAND:** I'm about to
22 change topics, I don't know -- it's
23 12:23. We could take a lunch break or
24 we could keep going for another 30 or
25 40 minutes?

1 **MR. GERMAN:** Up to everyone else.

2 **THE WITNESS:** I'm fine.

3 **MR. SUTHERLAND:** Okay.

4 **THE WITNESS:** Just let me get
5 some water.

6 **THE VIDEOGRAPHER:** We are going
7 to go off the record at 12:24, ending
8 media unit number 3.

9 (Lunch recess taken.)

10 **THE VIDEOGRAPHER:** Back on the
11 record, 1 p.m. This is media number 4
12 in the deposition of Flowers.

13 **CONTINUED BY MR. SUTHERLAND:**

14 Q. Dr. Flowers, before our lunch
15 break we spent some time at least briefly
16 introducing the topic of your use of Spearman
17 non-parametric correlation coefficient.

18 Do you remember that?

19 A. Yes.

20 Q. Can you describe for the judge
21 and the jury what is -- what does a Spearman
22 nonparametric correlation coefficient measure?

23 A. It measures the degree to which
24 multiple variables from 2 onward vary
25 sympathetically, monotonically increasing,

1 monotonically decreasing. If the
2 correlation coefficient is positive, then
3 that would indicate a monotonic positive
4 increasing relationship. If they are
5 decreasing, then it would be a decreasing
6 relationship. And it measures the
7 strength -- you do two things with it.
8 Strength, you usually look for one above .5,
9 and whether or not it's statistically
10 significant, and statistically significant
11 means what are the odds that this
12 relationship can occur randomly just because
13 of chance, like what we were exploring
14 earlier, a little bit of lead paint, a
15 little piece of pipe, a little piece of
16 arsenic-bearing waste magically appearing in
17 the same place to give this relationship,
18 and a Spearman coefficient indicates that
19 that's highly improbable because the
20 significance is much less than 1 in 10,000.

21 **Q. Where does the 1 in 10,000 come**
22 **from?**

23 A. Well, that's calculated as part
24 of -- it was provided in the auxiliary
25 materials, it gives the significance of the

1 correlation coefficients.

2 Q. Okay.

3 A. It's not in -- I just say -- I
4 may reference it by saying P is much, much
5 less than .0001.

6 Q. Okay.

7 And it's correct to say that the
8 Spearman correlation coefficient process, it
9 takes in this case the concentrations of the
10 metals and it converts them into a numerical
11 integer; correct?

12 A. More precisely, it ranks the
13 numerical values.

14 Q. So, for example, if you got a
15 sample set, the very highest value is going
16 to get a rank -- the highest value gets a
17 rank of like 1?

18 A. No. It's the other way around.

19 Q. Okay.

20 A. The lowest value gets a rank of
21 1, the highest value gets a rank of N where
22 N is the size of the data set.

23 Q. Okay.

24 And so to just make sure we're
25 talking about the same thing, if our data

1 set had a hundred samples in it, the highest
2 value would have a rank of 100; correct?

3 A. Yes. If they were all distinct
4 values, that would be true.

5 Q. And then the next highest value
6 would have a rank of 99?

7 A. Yes.

8 Q. All right.

9 (Exhibit 554, short table
10 containing Sample Dataset and Spearman
11 Correlation, marked for identification,
12 as of this date.)

13 Q. Okay. So I -- because statistics
14 are sometimes confusing, I went ahead and I
15 prepared a short table. Just so we can get
16 this for the record, I'm handing you what
17 I've marked as Exhibit 554, and this does
18 not -- the data here doesn't have anything
19 to do with this case. I just, in terms of
20 the data that was collected in the field, I
21 just made this up. Okay?

22 A. Okay.

23 Q. But I just, for purposes of
24 illustration, I just picked four samples,
25 and I just assigned concentrations to lead,

1 copper and arsenic to those four samples.

2 Do you see that?

3 A. Yes.

4 Q. And so for Sample 1, for
5 example, it's 500 ppm lead, 295 ppm copper
6 and arsenic 40 ppm; correct?

7 A. Right.

8 Q. And then what I did for these
9 four samples is then I just ranked them
10 according to which is the highest and which
11 is the low -- you know, second highest,
12 which is the third highest, and it looks
13 like I probably did it backwards because I
14 think I put the highest one --

15 A. Yes, you did do it backwards.

16 Q. Yes. But nevertheless, the
17 process, if you just flip the integers,
18 that's the way that Spearman works; right?

19 A. Right.

20 Q. And in this particular case
21 because the order of the lead and the copper
22 and the arsenic concentrations, the ranking
23 is the same for all three metals, for all
24 four of the samples, do you see that?

25 A. Yes.

Q. And so what the result would be from a Spearman analysis of this particular small set of made up samples would be you would get a Spearman correlation coefficient of 1 across the board; right?

A. Right. All the ranks are correlated.

(Exhibit 555, short table with
Sample Dataset and Spearman
Correlation, marked for identification,
as of this date.)

12 Q. I'm handing you a document that
13 I've marked as 555, and I've added three
14 columns to this one.

15 | Do you see that?

16 A. Yes.

17 Q. Where I've added the lead to
18 copper ratio, the lead to arsenic ratio and
19 the copper to arsenic ratio.

Do you see that?

21 A. Yes.

22 Q. And the samples themselves, I'll
23 represent to you, are unchanged, the values
24 are the same.

25 Do you agree with that?

1 A. Yes.

2 Q. And what I'm trying to illustrate
3 here is that the Spearman correlation
4 coefficient, it doesn't give you any
5 information about variability within those
6 metal ratios; is that right? Would you
7 agree with that?

8 A. Not within the ratios; no.

9 Because I didn't do ratios.

10 Q. And the Spearman analysis that
11 you did wouldn't really give you any
12 information about what those ratios and what
13 those ratios might vary across the proposed
14 class area, would it?

15 A. It might.

16 Q. It might and it might not?

17 A. I don't know.

18 Q. You don't know. Okay.

19 Do you ever use principal
20 component analysis in your work?

21 A. I teach it.

22 Q. Okay.

23 Did you consider using principal
24 component analysis here?

25 A. I could tell from looking at the

1 data that the first eigenvalue was going to
2 be copper, that's the main variable that's
3 varying across the class area, but I didn't
4 pursue it beyond that.

5 Q. If you could look at Exhibit 547
6 for me, it's the Geosyntec document.

7 A. Okay.

8 Q. And if you could turn to Bates
9 USMR01074664. Do you see on Bates 664 that
10 that's a diagram from a principal component
11 analysis; correct?

12 A. Yeah. It's consistent.

13 Q. And it shows that the transect
14 samples which are encompassed within that
15 trapezoidal figure are distinct from the
16 site sample numbers which are down in the
17 lower right corner; correct?

18 MR. GERMAN: Objection.

19 A. That's what the graph says.

20 Q. And it's your testimony that you
21 didn't see Exhibit 547 before you issued
22 your report; correct?

23 A. That's correct.

24 Q. If you had reviewed Exhibit 547,
25 could you have at least drawn some basic

1 conclusions regarding the principal component
2 analysis that was conducted by Geosyntec?

3 A. If I had all the background
4 information, what the loadings on the
5 components are, things like that, the data.

6 Q. If you had had the data, you
7 could have done your own analysis to confirm
8 or deny?

9 A. If I had everything that went
10 into this diagram, I could have done this
11 analysis; yeah.

12 Q. But it's your testimony that you
13 weren't asked to do that prior to completing
14 your report; correct?

15 A. Right.

16 Q. And you don't know whether or
17 not all those materials were produced to the
18 plaintiffs or not; right?

19 A. What materials?

20 Q. You don't know whether all that
21 underlying data and analysis that underlies
22 this particular figure --

23 A. I do not.

24 Q. -- whether that was available --

25 A. I don't know.

1 Q. -- to the plaintiffs' lawyers?

2 You don't know that?

3 A. I don't know.

4 Q. On page 8 of your report --

5 A. Okay.

6 Q. You -- under chemical
7 characteristics of smelter emissions, do you
8 see that?

9 A. Yes.

10 Q. And one of the things there is
11 that you state in your report most of the
12 particulates, 80%, were less than 53 microns
13 in size.

14 A. According to Okanigby, et al.
15 2017 for a smelter in South Africa.

16 Q. And so that gave you information,
17 at least general information for another
18 smelter as to what kind of particulate size
19 you would expect from a smelting facility;
20 is that right?

21 A. Yes. Most of them are less than
22 53 microns.

23 Q. And then you go on and state
24 that compositionally, those particulates,
25 you would expect to have copper in them with

1 **smaller amounts of lead and zinc; is that**
2 **right?**

3 A. Yes. They didn't report any
4 analyses for arsenic.

5 Q. **And did you -- did you**
6 **compare -- the ratio that you got there of**
7 **the composition of those particulates, the**
8 **copper is about 120 times higher than the**
9 **lead; right?**

10 A. Right. But these are samples
11 taken from electrostatic precipitators.
12 This would be the strongest signal of the
13 smelter.

14 Q. **Did you compare that ratio of**
15 **copper to lead for what you're observing in**
16 **soil samples within Carteret?**

17 A. No, it's a different smelter.

18 Q. **And because it's a different**
19 **smelter, you expect it to be different?**

20 A. It may be the same, it may be
21 different. I can't tell.

22 Q. **But the answer to my question is**
23 **you didn't look at it as --**

24 A. No, I didn't.

25 Q. **-- being indicative of what you**

1 **would expect within Carteret?**

2 A. No. It was illustrated.

3 Q. **And then you go on to say that**
4 **the morphology of the particulate you would**
5 **expect to be spherulitic particles; correct?**

6 A. Yes.

7 Q. **And so setting out on page 8,**
8 **you've essentially identified at least a**
9 **starting point for what you would expect the**
10 **air emissions from the smelter to look like**
11 **as far as particle size, chemical composition**
12 **and morphology; right?**

13 A. With the --

14 **MR. GERMAN:** Objection. You can
15 answer.

16 A. With the exception I don't know
17 what arsenic to expect. If it's two things,
18 if it's dust per se, then it's going to be
19 different than something that condenses from
20 a gas phase. The gas phase will be the
21 spherulitic material. So what this is,
22 again, is illustrative of what can happen in
23 a smelter.

24 Q. **You could have used what you**
25 **define on page 8 of your report as a starting**

1 point at least to do some microscopy
2 analysis to look for particles that meet
3 these criteria; correct?

4 MR. GERMAN: Objection.

5 A. I didn't consider it necessary
6 to do that.

7 Q. But you could have based upon
8 what you've outlined on page 8, you could
9 have done that?

10 A. You could do all kinds of
11 things, but I didn't think it was necessary.
12 I didn't do it.

13 Q. Okay.

14 But that's what you did in your
15 case in Pennsylvania with the coal fire --

16 A. But that was what I was tasked
17 to do, was to look for the presence of fly
18 ash on properties as opposed to chemical
19 contamination.

20 Q. Okay.

21 A. Now, the problem with microscopy
22 is that if you take a sample, you separate
23 it, you magnify it, and you characterize it,
24 it's very difficult to get back to what the
25 bulk sample is going to read in terms of a

1 chemical analysis. So if you see like a
2 piece of lead paint, you don't know how many
3 pieces of lead paint are in a six inch core
4 sample. There may be one. There's a lot of
5 soil particles, a lot of weight that is not
6 lead paint, and so it may be diluted out so
7 it's insignificant. It's very difficult to
8 go from the microscopic to the macroscopic.

9 Q. They're really two different
10 analyses in terms of what you learn from
11 them; correct?

12 A. Right.

13 Q. I mean, microscopy is much more
14 useful at identifying particular types of
15 materials in terms of identifying their
16 source; right?

17 MR. GERMAN: Objection.

18 A. It is --

19 MR. GERMAN: You can answer.

20 A. It is useful in determining what
21 the particle is, what its shape is, how big
22 is it, what its chemical composition is, but
23 it has very little relevance to a bulk sample.

24 Q. Yeah. If I understand you
25 correctly, what you're saying is that you

1 really can't translate what you get from a
2 scanning electron microscope with EDS to a
3 concentration of lead in a soil sample; right?

4 A. That's correct.

5 Q. If you go back to page 2 of your
6 report and look under Roman 5, the fifth
7 numbered paragraph, about two thirds of the
8 way of that paragraph, there's a sentence
9 that starts numerous individual sources.

10 Do you see that?

11 A. Yes.

12 Q. And the sentence reads: Numerous
13 individual sources would give rise to a more
14 highly random localized pattern of
15 contamination that is not observed in the
16 thousands of samples taken in Carteret.

17 Do you see that?

18 A. Yes.

19 Q. How is that characterization of
20 a highly random localized pattern different
21 from what we see in the variograms in the
22 transects for Exhibit 547? And I'm
23 referring specifically to the Bates pages
24 that begin with USMR01074711.

25 **MR. GERMAN:** Objection.

1 A. Well, let's go back to what we
2 were just talking about. We have a soil
3 sample and we'll take your hypothesis that
4 that soil sample, the lead loadings, the
5 arsenic loadings and the copper loadings are
6 due to everything else except the smelter,
7 and we have one soil sample and we see this
8 in, for example, some of the data taken on
9 parcels, it will be clean here, it will be
10 high here, it will -- you know, it varies
11 all over the place, and so -- but to get a
12 generalized pattern of copper contamination
13 as is seen in the class area, you can't --
14 it seems to me very improbable that you can
15 get individual sources to give you that answer.

16 Q. **Are you -- are you relying on the**
17 **Spearman analysis to reach that conclusion?**

18 A. You can look at the samples.
19 The samples are contaminated with copper all
20 the way out to the edge of the class area.

21 Q. **I mean, what's confusing me,**
22 **Dr. Flowers, is you just described a property**
23 **where you had concentrations varying from**
24 **bore hole to bore hole and you said the**
25 **concentrations vary all over the place I**

1 think was your words, and how is that
2 different from a highly random localized
3 pattern that you say is associated with
4 numerous individual sources?

5 A. Well, first of all --

6 **MR. GERMAN:** Objection. You can
7 answer.

8 A. First of all, I was giving a
9 hypothetical. And my hypothetical was how
10 do we get an entire class area contaminated
11 with highly correlated metals using individual
12 sources, and it would require every source
13 to be present most of the time in every
14 sample, and for when one source went up,
15 when one element went up, the others went
16 up, when it went down, the others went down.
17 That's very difficult to do with individual
18 sources. You have to go, you know, and get
19 the right amount of lead paint, you have to
20 get the right amount of some coppers from
21 somewhere, you have to get the arsenic from
22 somewhere if you want to take those,
23 whatever your alternative sources are, and
24 the idea that somehow they all line up and
25 they give this pattern that we see in the

1 class area, I find that to be very improbable.

2 Q. Well, you haven't evaluated the
3 relative ratios of the metals; right?

4 A. I don't think you have to.

5 Q. Well, I think there's probably
6 just going to be a disagreement about that.

7 A. Well, I think we can agree to
8 disagree. I say you have a big source,
9 giant source. Let's go way back in the
10 beginning of the smelter. Produced 10,000
11 tons of copper. The concentrate it was fed,
12 let's just be very generous and say it was
13 point 4% copper, I mean, 40% copper, well,
14 that means it would produce 75,000 tons of
15 waste material, and that waste material
16 would be slag, it would be stuff coming out
17 of the stack, no air pollution control.
18 When the first smelter came online, it was
19 an open pipe to the atmosphere. It's
20 entirely feasible that the contamination --
21 most of the contamination could have
22 occurred then.

23 Q. You haven't done, and I think
24 we've already established this, but just to
25 make it clear, you haven't done any kind of

1 emissions inventory that would quantify how
2 much emissions went out as air emissions
3 versus what was produced as slag from the
4 fraction of non-copper, you haven't done
5 that, have you?

6 A. I can say the slag was more
7 tonnage than the air fall, but the exact
8 numbers, I don't -- but tons went into the
9 air and tons went on the ground.

10 Q. Another thing that you have not
11 done is you have not done any kind of
12 analysis of when the properties were built
13 within Carteret and how much lead was
14 contributed to this community by the use of
15 lead-based paint over the years; correct?

16 A. Well, I would put it to you this
17 way. You could take all the lead-based
18 paint that was scraped off every house in
19 Carteret and weigh it and it was nothing
20 like what came out of that smelter.

21 Q. Have you done that calculation?

22 A. No, I haven't.

23 Q. Your testimony is you don't have
24 to?

25 A. No, I don't, because smelter

1 produces at the ton level, and lead-based
2 paint is low density, it's not very thick on
3 the side of the house. I guarantee you
4 there's more stuff coming out of the smelter
5 than there is coming off a house.

6 **Q. Your testimony is that**
7 **lead-based paint is low density?**

8 A. Compared to a smelter waste.
9 Have you picked up a chip of paint? Does it
10 go (indicating)?

11 Q. **Have you --**
12 A. It's not just lead in the lead
13 paint.

14 Q. **You haven't done -- you haven't**
15 **done a mass balance of --**

16 A. No one can do a mass balance
17 because they don't have the data.

18 Q. **Well, you can estimate it; right?**
19 A. Well, sure.

20 Q. **I mean, we know -- we know**
21 **roughly what the lead content of paint was**
22 **historically; right?**

23 A. Okay.

24 Q. **Isn't that true?**
25 A. You can get some idea.

1 Q. And we can look at a house and
2 see how much paint its surface had; correct?
3

4 A. Sure.

5 Q. And we could look at based upon
6 the age of the house under a normal
7 repainting cycle how many times it was
likely painted; correct?

8 MR. GERMAN: Objection.

9 A. Sure.

10 Q. And we can come up with a number
11 of approximately how much lead was added to
12 that property based upon the historical use
13 of lead-based paint?

14 MR. GERMAN: Objection.

15 A. I don't think you can go that far.

16 Q. Well, but, I mean, you can at
17 least get to the total mass, even if we're
18 not down into the total soil yet --

19 A. Yeah.

20 Q. -- we can get to the total mass
21 of lead that was put on the house.

22 A. You can get an estimate; sure.

23 Q. And you told me in the prior
24 deposition that we had on the Kay County
25 case everything breaks down; right?

1 A. Sure.

2 Q. **I mean, that's entropy; right?**

3 A. Yeah.

4 Q. **And so a lot of that lead is
5 going to break down from the paint and it's
6 going to end up in the yard, isn't it?**

7 **MR. GERMAN:** Objection.

8 A. It has potential for ending up
9 in the yard, but I guarantee you what's
10 coming out of that smelter is a lot more.

11 Q. **But you haven't done the
12 calculations to --**

13 A. I don't have to do the
14 calculations. All I know is that thing
15 produces 80,000 tons of copper or 70,000
16 tons of copper and produces 75,000 tons of
17 waste, it's a high temperature process, it's
18 got a stack, it may or may not have had air
19 pollution control, the ores are typically
20 laced with arsenic and lead, so you have a
21 pollution generator. You also have a copper
22 smelter, but it's also a pollution generator.
23 And it dwarfs the rest of the sources.

24 Q. **And you're not an air emissions
25 expert; correct?**

1 A. No, I'm not.

2 Q. **And you have not --**

3 A. But that, I don't think you have
4 to be to make my -- the statement I made.

5 Q. **That's fine.**

6 **And you have not done a**
7 **quantitative calculation of even if we**
8 **accept your postulation as to the historical**
9 **record, you haven't done a calculation as to**
10 **how much of that waste --**

11 A. I don't think anyone --

12 Q. **Let me finish --**

13 A. -- can do that --

14 Q. -- **my question.**

15 A. -- that calculation.

16 Q. **Let me finish my question.**

17 A. Yeah.

18 Q. **You have not done a calculation**
19 **of how much of those materials actually**
20 **ended up in the proposed class area?**

21 A. No one can do that calculation.

22 (Exhibit 556, study entitled
23 Extent, Characterization, and Sources
24 of Soil Lead Contamination in
25 Small-Urban Residential Neighborhoods,

1 marked for identification, as of this
2 date.)

3 Q. I hand you a document which I've
4 marked as Exhibit 556.

5 Have you ever seen that document
6 before, Dr. Flowers?

7 A. No.

8 Q. Exhibit 556 is a study that's
9 entitled Extent, Characterization and
10 Sources of Soil Lead Contamination in Small-
11 Urban Residential Neighborhoods.

12 Do you see that?

13 A. Yes.

14 Q. And the authors are Jeffrey
15 Clark and Andrew Knudsen.

16 Do you see that?

17 A. Yes.

18 Q. And in the abstract of the
19 article, the first sentence states: We
20 present high spatial-resolution mapping of
21 soil lead concentrations in a small-urban
22 residential setting.

23 Do you see that?

24 A. Yes.

25 Q. Would you agree that Carteret is

1 a small-urban residential setting?

2 A. Yes, with a smelter.

3 Q. And then the authors go on to
4 say that they did x-ray fluorescence and
5 used -- was used to measure soil at 170
6 properties in the City Park neighborhood of
7 Appleton, Wisconsin.

8 Do you see that?

9 A. Yes.

10 Q. And they -- then if you skip a
11 few lines down, they indicate that they
12 sampled in three front yard locations, the
13 drip line, the mid-yard and the terrace at
14 71 properties.

15 Do you see that?

16 A. Yes.

17 Q. And their results, they
18 summarize a few more lines further down,
19 they say: Approximately 40% of the yard
20 space exceeded concentrations of 400
21 micrograms per gram, which I think is the
22 same thing as parts per million.

23 Do you agree with that?

24 A. Yes. That's what it says.

25 Q. And they indicate that these

1 patterns of contamination are consistent
2 with lead paint as the main contributor of
3 lead to soil.

4 **Do you see that?**

5 A. Yeah.

6 Q. If you jump over to history of
7 lead use in the residential environment, the
8 first sentence states: The two main sources
9 of lead in urban residential environment are
10 combustion of leaded gasoline and the
11 deterioration of exterior paints.

12 **Do you see that?**

13 A. Yeah.

14 Q. And then they go on, skipping a
15 few sentences, the use of lead is a paint
16 additive peaked in the 1920s, before
17 advocacy and legislative efforts during the
18 post-World War II housing boom led to a
19 steep decline in the use of lead in house
20 paints.

21 **Do you see that?**

22 A. Yes.

23 Q. And that statement is consistent
24 with the discussion we had before lunch
25 where we were talking about lead values for

1 older housing tends to be higher than those
2 after the second world war or after 1950;
3 right?

4 A. That's true.

5 Q. And then if you skip over to the
6 next page at the bottom of the first column,
7 the study -- the authors explain this study
8 differs from previous works in two important
9 ways. First, our study site is a small city
10 rather than a major urban area. Second, we
11 conduct a high spatial-resolution survey of,
12 and they use an acronym SLL, that's -- I
13 think that stands for soil lead level -- so
14 they -- we conduct a high spatial-resolution
15 survey of SLL, focusing first on a single
16 residential neighborhood and then a city
17 block.

18 Do you see that?

19 A. Yes.

20 Q. And this was a study that was
21 done in -- well, let me ask the question.
22 Do you know whether Appleton, Wisconsin has
23 a smelter in it?

24 A. I would think probably not.

25 Q. And so the authors were seeking

1 to try and determine the impact on soil lead
2 from lead-based paint into a lesser extent
3 from automobile emissions; correct?

4 MR. GERMAN: Objection.

5 A. Yes.

6 Q. And then if we go over to page
7 1502, there's some box of whisker plots up
8 there at the top of the page.

9 Are you there?

10 A. Yes.

11 Q. In the first column of that page
12 about a third of the way down, the authors
13 report: Nearly half the samples exceeded
14 400 micrograms per gram, and this zone, that
15 is the exceedance of 400 ppm, extended
16 several meters into the yard all the way
17 around the home.

18 Do you see that?

19 A. Yes.

20 Q. And then we skip a sentence and
21 then the authors go on: Where homes are
22 close to one another (see, for example, the
23 two homes in the northwest corner of Figure
24 1b), the concentrations tend to remain
25 relatively high even in the mid-lawn area.

1 **Do you see that?**

2 A. Yes.

3 Q. **Have you been to Carteret?**

4 A. Yes.

5 Q. **And the homes in Carteret, many
6 of them are very close to one another; correct?**

7 A. Yes.

8 Q. **The authors then in this study
9 go on to say: Soil lead levels near
10 outbuildings are also often elevated.**

11 **And you would agree with me that
12 in Carteret there is a high frequency of
13 detached garages and detached storage areas;
14 correct?**

15 **MR. GERMAN:** Objection.

16 A. I --

17 **MR. GERMAN:** You can answer.

18 A. I didn't look for them
19 specifically, but I would suspect there are.

20 Q. **And it's also true then in a
21 community as old as Carteret, a lot of times
22 those older structures existed previously
23 and have been torn down; correct?**

24 **MR. GERMAN:** Objection. You can
25 answer.

1 A. That's possible.

2 Q. So then the authors go on to
3 state: The detailed-block study suggests
4 that a large proportion of the soil in older
5 neighborhoods is likely contaminated. Based
6 on the interpolated data, approximately 40%
7 of the yard area has soil lead levels
8 greater than 400 parts per million.

9 Do you see that?

10 A. Yes.

11 Q. And then if we look at the
12 right-hand box and whisker plot that's up in
13 Figure 2, this reports the lead concentrations
14 for the drip line, the mid-lawn and the
15 terrace; correct?

16 A. Yes.

17 Q. And if you look at the larger, I
18 think what we're looking at is the larger of
19 the two is -- shows all of the data --

20 A. Mm-hmm.

21 Q. -- even the high points, and the
22 one that's kind of inset inside the larger
23 one is just showing the boxes for the 25th
24 percentile and the 75th percentile and the
25 median value; correct?

1 A. Well, I think it's just another
2 representation of the lower diagram.

3 Q. Right. Yeah. But it gives
4 you a little bit better idea of where the
5 25 percent and 75 percentile levels are;
6 right?

7 A. Sure, in this town.

8 Q. And if you look at the
9 mid-lawn -- well, let me back up.

10 You would agree with me based
11 upon the definitions that I've read to you
12 from this paper, the mid-lawn's not -- it's
13 out in the middle of the yard; right?

14 A. Yes.

15 Q. And in this particular town,
16 without a smelter, there were mid-lawn
17 samples that approached 4,000 parts per
18 million; correct?

19 A. Some samples; yeah.

20 Q. And if you look at the smaller
21 inset up above there, the 75 percentile
22 number, that is the top of the box for the
23 mid-lawn, that's around 500 parts per million;
24 right?

25 A. 400 -- mid-lawn? Yeah. 500.

1 Q. Yes. Because I think that dash
2 line is actually 400.

3 A. Yeah. That's what it is.

4 Q. And let's go back and look at
5 Mr. Sullivan's averages for the class area.
6 So looking at Mr. Sullivan's average for the
7 class area and the top zero to six inches
8 that we can see on Exhibit 550, what was the
9 average concentration in the class area
10 according to Mr. Sullivan in that top interval?

11 MR. GERMAN: Objection.

12 A. It's not average.

13 Q. Or median. I'm sorry. I keep
14 doing that.

15 What was the median concentration?

16 A. For -- once again?

17 Q. For the zero to six inch top
18 interval.

19 A. 250. Consistent with the lead
20 paint diagram.

21 Q. You say it is consistent with
22 the lead paint diagram?

23 A. I mean, the numbers are different.

24 Q. The number from Carteret is
25 actually less than the number from Appleton,

1 isn't it?

2 A. For the median, yeah.

3 Q. And Appleton had lead-based
4 paint, but it didn't have a smelter; right?

5 A. It's true.

6 Q. If you could flip over to page
7 1505, if you look in the middle of that
8 first column, there's a paragraph that
9 starts with our study area.

10 A. Yes.

11 Q. Do you see that?

12 A. Yes.

13 Q. And the first two sentences
14 read: Our study area is not exceptional and
15 the trends we report here are likely to be
16 similar in smaller urban residential
17 communities across the country. We know
18 that the best predictor contamination is the
19 age of the structure with those built before
20 1960 returning significantly higher soil
21 lead levels.

22 Did I read that correctly?

23 MR. GERMAN: Objection.

24 A. Yes.

25 Q. Do you have any reason or basis

1 to contest the authors of this paper, that
2 is, Mr. Clark and Mr. Knudsen's, conclusion
3 that their results are not exceptional and
4 are likely similar to other smaller urban
5 residential communities?

6 MR. GERMAN: Objection. He
7 hasn't read the whole paper, but --

8 A. Well, without a smelter.

9 Q. Well, you would suspect that a
10 community without a smelter would actually
11 have lower lead concentration levels than
12 one with a smelter, all other things being
13 equal; right?

14 MR. GERMAN: Objection. Same
15 objection.

16 A. Maybe, maybe not.

17 Q. All other things being equal,
18 one community has --

19 A. What do you mean by things being
20 equal?

21 Q. Everything like housing age,
22 housing condition, housing maintenance, all
23 the things that relate to lead-based paint,
24 traffic volume, all of the things that lead
25 to that, you have one community that has a

1 smelter and one community that doesn't, you
2 would expect the community with the smelter
3 to have higher lead concentrations; right?

4 **MR. GERMAN:** Objection. Form.

5 Foundation, incomplete hypothetical.

6 A. The smelter would be an additive
7 component.

8 (Exhibit 557, census data for
9 Carteret, marked for identification, as
10 of this date.)

11 **Q.** I hand you a document we've
12 marked as Exhibit 557.

13 Have you looked at the census
14 data for Carteret?

15 A. No.

16 **Q.** I'll represent to you that
17 Exhibit 557 is a census data that I just
18 printed off of the internet on the housing
19 stock within Carteret.

20 Do you understand that?

21 A. Yes.

22 **Q.** And if you just look at the
23 first page of Exhibit 557, there's an
24 indication on housing units, the year that
25 they were built.

1 **Do you see that?**

2 A. Yes.

3 Q. **And it indicates for houses**
4 **built between 1950 and 1959 that those make**
5 **up 26.7% of the Carteret housing?**

6 A. Yes.

7 Q. **And then from built from 1940 to**
8 **1949, they represent 13.4% of the --**

9 A. Yes.

10 **MR. GERMAN:** Objection.

11 **Q. And then built prior to 1939,**
12 **that's 16.6% of the housing stock; correct?**

13 A. Yes.

14 Q. **And you would agree with me that**
15 **those three age ranges are the ones that are**
16 **most likely to contain significant quantities**
17 **of lead-based paint; correct?**

18 **MR. GERMAN:** Objection. You can
19 answer.

20 A. At one time, perhaps.

21 Q. **And if we look at those totals,**
22 **that's more than 55% of the housing stock in**
23 **the community of Carteret; correct?**

24 A. Yeah, if you add the numbers up.

25 Q. **Dr. Flowers, if you go to**

1 Exhibit 548, it's the Overview of Alternate
2 Sources of Copper, Lead and Arsenic.

3 A. Okay.

4 Q. And this is a presentation
5 that's dated October 26, 2018; correct?

6 A. Yes.

7 Q. And so that was from seven, over
8 seven months ago; right?

9 A. Yes.

10 Q. And if you look, the initial
11 section of Exhibit 548 evaluates the
12 historical use of land for agriculture in
13 Carteret and chemical use associated with
14 those agricultural activities.

15 Do you see that?

16 A. Yeah.

17 Q. And if you turn to Bates
18 USMR01155857, there's a map of Carteret from
19 1850.

20 Do you see that?

21 A. Yes.

22 Q. And there's a reference for that
23 map that's included on that PowerPoint slide
24 that indicates where it came from; right?

25 A. Right.

1 Q. And as part of that map, there
2 are names that are circled as farmers who or
3 at least people who lived within Carteret
4 during that time period.

5 Do you see that?

6 A. Yeah.

7 Q. And then if you go to, skip a
8 few pages to USMR 01155860.

9 A. Okay.

10 Q. You will see a copy of a page
11 from the 1850 farm census.

12 Do you see that?

13 A. Yeah.

14 Q. And I realize it's difficult to
15 read, but there's a reference on which census
16 and where that data came from; correct?

17 A. Yes.

18 Q. And what the consultant has done
19 here is they've identified the farmers that
20 are circled on the map by name on the census
21 itself.

22 Do you understand that?

23 A. Yes.

24 Q. And you don't have any
25 information as you sit here today that would

1 suggest to you that those farmers weren't
2 actually farming in the Carteret community
3 in the time period for this particular
4 presentation, 1850, do you?

5 MR. GERMAN: Objection.

6 A. No, I don't have anything to
7 contradict it.

8 Q. And the census sets out that
9 those farmers were growing things like
10 potatoes and orchard produce on the farms
11 that they were actively farming at that
12 point in time.

13 Do you see that?

14 A. Yes.

15 Q. And if you go through this
16 presentation, and I don't want to go through
17 every single page, but there are subsequent
18 maps for 1876 and then census data for 1870,
19 a map for 1887 and then the data from the
20 1880 census on crops that were grown.

21 Do you see that?

22 A. Mm-hmm.

23 Q. Is that a yes?

24 A. Yes.

25 Q. Okay.

1 **And, again, you don't have any**
2 **information as you sit here today that any**
3 **of the information that's presented with**
4 **respect to these maps, the location of these**
5 **farmers and the crops that they grew at the**
6 **relevant time periods are inaccurate or**
7 **incorrect; right?**

8 **MR. GERMAN:** Objection.

9 A. No, I have no information about
10 this. I haven't looked at this.

11 Q. **And there are references that**
12 **are included in these PowerPoint slides for**
13 **all the underlying information that's**
14 **reported here; correct?**

15 A. Yes.

16 Q. **And you could have, if you had**
17 **had access to these documents prior to doing**
18 **your report, have obtained those references**
19 **and cross-checked this information; right?**

20 A. I don't see why I would have,
21 but I could have.

22 Q. **You could have done that; right?**

23 A. You can do lots of things, but I
24 couldn't -- you know, I don't see any purpose.

25 Q. **Okay.**

1 And then if you go on to the
2 next page, USMR01155874, there's a citation
3 to a document by Donald EH Frear, Chemistry
4 of Insecticides and Fungicides from 1948 and
5 a quote from the Colorado potato beetle.

6 Do you see that?

7 A. Yes.

8 Q. And this document, Mr. Frear's
9 Chemistry of Insecticides and Fungicides,
10 reports that by 1874, copper arsenates were
11 used to control the Colorado potato beetle.

12 Do you see that?

13 A. That's what it says; yeah.

14 Q. And you don't have any reason to
15 believe that that's not true; right?

16 MR. GERMAN: Objection.

17 A. The only comment, which I do
18 mention, is that first Paris Green was
19 phytotoxic if it was oversprayed, and
20 secondly it was replaced later on by the
21 lead arsenates, but the fact that there were
22 pests and needed -- they needed control
23 according to the farmers, that's a
24 possibility, and the report on pesticide use
25 in New Jersey, they make a point that the

1 intensive use of pesticides was more for
2 commercial operations rather than individual
3 farms, but it's impossible to know what
4 frequency of use, whether they used them at
5 all. It just says the worms were there, the
6 farms were there, but there's no connection
7 between the two.

8 Q. Well, we know based upon these
9 documents that the farms were there, as you
10 say; right?

11 A. Yes.

12 Q. And we know based upon these
13 documents that the farmers were growing
14 potatoes; correct?

15 A. That's true.

16 Q. And we know that from
17 contemporaneous documents that potatoes were
18 subject to infestation with the Colorado
19 beetle; correct?

20 A. That's true.

21 Q. And we know that during this
22 time period the pesticide that was applied
23 to control the Colorado beetle was Paris
24 Green; correct?

25 MR. GERMAN: Objection to form.

1 A. But we don't know if these
2 farmers spent the money to buy the pesticide
3 to put on it.

4 Q. But the answer to my question is
5 yes, we know that Paris Green was used to
6 control for the potato beetle, we may not
7 know if the particular farmers used it --

8 A. We don't know if it was used
9 here.

10 Q. Right. But we know as a general
11 matter for the agricultural community in the
12 late 1800s, Paris Green was an insecticide a
13 that was used to control the Colorado beetle?

14 MR. GERMAN: Objection.

15 A. Predominantly in commercial
16 operations.

17 Q. All right.

18 Let me address your attention to
19 USMR01155876.

20 This is an advertisement from
21 The Independent Hour, which was a newspaper
22 in Woodbridge, New Jersey, from June 8 of 1876.

23 Do you see that citation?

24 A. Yes.

25 Q. And do you know where Woodbridge,

1 New Jersey is?

2 A. Not exactly.

3 Q. **It's just south of Carteret.**

4 A. Just south?

5 Q. **Yes. And it was at this point
6 in time the largest community around these
7 farms.**

8 **Will you accept that?**

9 **MR. GERMAN:** Objection.

10 That's --

11 A. I'll take your word for it. I
12 don't know.

13 Q. **And a local newspaper had an
14 advertisement from a hardware store.**

15 **Do you see that?**

16 A. Yes.

17 Q. **And that hardware store was
18 advertising potato bug exterminator.**

19 **Do you see that?**

20 **MR. GERMAN:** Objection.

21 A. Right.

22 Q. **And that is -- and then right
23 above that, that's Paris Green; right?**

24 A. Yeah.

25 Q. **And that would suggest that not**

1 only big commercial farms, but hardware
2 store customers were using Paris Green to
3 control the Colorado potato beetle; right?

4 **MR. GERMAN:** Objection.

5 A. I don't think that necessarily
6 follows. It might have sat on the shelf --

7 Q. **Well, they were --**

8 A. -- because it was too expensive.

9 Q. **Well, they were at least**
10 **advertising it in the community; right?**

11 **MR. GERMAN:** Objection.

12 A. Maybe that's why they were
13 advertising it. If it flew off the shelves,
14 they wouldn't be advertising it.

15 Q. **Is that why they're advertising**
16 **agricultural implements, too, is because**
17 **they're not being sold?**

18 **MR. GERMAN:** Objection.

19 A. Well, I'm just saying that
20 buying chemicals may have been too expensive
21 for --

22 Q. **But you don't --**

23 A. -- individual farmers. I don't
24 know that. You don't know that.

25 Q. **Right. I mean, nobody -- we**

1 don't --

2 A. No one knows that.

3 Q. Okay. Fine.

4 And then if you jump over to the
5 next page, this is Bates 1155877, there's
6 another little newspaper article from the
7 Courier Post in Camden, New Jersey from June
8 27 of 1885.

9 Do you see that?

10 A. Yes.

11 Q. And it indicates that Paris Green
12 for killing the potato bugs, that some
13 families were poisoned because they ate
14 strawberries next to where the potato patch
15 was?

16 MR. GERMAN: Objection.

17 A. Yeah.

18 Q. Is that what it says? Yes?

19 A. That's what it says.

20 Q. And that suggests that at least
21 one farmer in Rahway, which is just north of
22 Carteret, was using Paris Green to control
23 Colorado potato beetles; correct?

24 MR. GERMAN: Objection.

25 A. Yes. And he got a little

1 rambunctious with the spray.

2 Q. Do you know what caused the
3 famine in Ireland when all the potatoes died?

4 A. Pests.

5 Q. It was fungus, wasn't it, the
6 potato famine was a fungus?

7 A. A pest; yes.

8 Q. And you would agree with me that
9 potatoes are particularly susceptible to
10 fungus; right?

11 A. Yes.

12 Q. And if you look at Bates 1155879,
13 the most common fungicide at that point in
14 time was something called the Bordeaux
15 mixture.

16 Do you see that?

17 (Witness reviewing document.)

18 A. Yes.

19 Q. And the Bordeaux mixture was a
20 mixture of copper sulfate and lime; right?

21 A. Right. But this refers to
22 treating fungal diseases on grapes.

23 Q. Well, if you go to the next
24 page, the State Board of Agriculture for New
25 Jersey recommended the Bordeaux mixture in

1 | 1889 to treat potato blight, didn't it?

2 (Witness reviewing document.)

3 MR. GERMAN: Objection.

4 A. Yes.

5 Q. If there was a farmer, and we
6 know that they were growing potatoes, but if
7 he wanted to protect his crop against potato
8 blight and he applied the Bordeaux mixture
9 to his potatoes, he would be introducing
10 copper to the soil where his farm is; right?

11 A. If everything you say is true,
12 that would be true.

13 Q. Turn to page Bates 1155888.

14 This is a citation to a paper by it looks
15 like Hangsford entitled Elements in Fruits
16 and Vegetables From Areas of Commercial
17 Production in the Coterminous States, it's
18 a U.S. Geological Survey publication.

19 | Do you see that?

20 A. Yes.

21 Q. And one of the things that this
22 study was reporting on was the concentration
23 of copper in soils where potatoes were grown.

Do you see that?

25 A. Yes.

1 Q. And the study reports that the
2 mean copper value for potatoes -- for potato
3 field soils in New Jersey for the soils that
4 they tested was 140 parts per million.

5 Do you see that?

6 A. Yes.

7 Q. And that's the mean there, that
8 means the average; right?

9 A. Yes.

10 Q. And so there would be values
11 and, you know, approximately half of the
12 values are going to be higher than 140 parts
13 per million; correct?

14 A. Right. But they're not over
15 3,100.

16 Q. Do you know what the average
17 copper concentration is in the transects and
18 the samples that the plaintiffs collected?

19 A. It's not 3,100. It's much less
20 than that.

21 Q. Do you know --

22 A. It's in my table.

23 Q. Do you know if it's greater than
24 140?

25 A. Yes.

1 Q. **It is greater than 140?**

2 A. Yes. I'm pretty sure.

3 Q. **Let me see.**

4 A. Let's check it to be sure.

5 228.

6 Q. **228.**

7 A. Are we still on the same
8 document?

9 Q. **We may be done. Hold on. No,**
10 **I'm not done.**

11 **If you go to page 26 of your**
12 **report. If you look at the second complete**
13 **paragraph on page 26.**

14 A. Okay.

15 Q. **The first sentence states:**
16 **Historical fill is mainly used to create**
17 **land by filling in waterbodies. A map of**
18 **the Carteret area shows that portions of the**
19 **Arthur Kill were filled near Carteret, but**
20 **there is no indication of widespread use of**
21 **fill in Carteret proper, especially where**
22 **sampled by USMR.**

23 **Do you see that?**

24 A. Yes.

25 Q. **What evaluation, research did**

1 you do to reach the conclusion that there is
2 no indication of widespread use of fill in
3 Carteret proper?

4 A. The State of New Jersey produces
5 a set of maps that shows where fill was used.

6 Q. Did you do anything besides look
7 at the New Jersey fill maps?

8 A. No.

9 Q. So you did not look at the
10 boring logs, for example --

11 A. No.

12 Q. The boring logs can give you
13 information regarding the presence of
14 non-native materials that are typically
15 associated with fill; right?

16 A. Yes.

17 Q. But you chose not to do that?

18 A. Right.

19 **MR. GERMAN:** Objection.

20 A. Again, I considered all fill,
21 pesticides, fungicides, your whole laundry
22 list in here to be a second order effect
23 compared to the smelter which was the
24 dominant effect.

25 Q. If you could go back to Exhibit

1 548, that's the historical document.

2 A. Okay.

3 Q. And turn to Bates 1155898. And
4 there are three little snippets from the
5 Carteret Press, one from 1928 and one from --
6 well, two from 1928 and one from 1937.

7 Do you see that?

8 A. Yes.

9 Q. And the first one reports that
10 there was a gap in Everard Street and that
11 that gap would be filled by putting in
12 garbage.

13 Do you see that?

14 A. Yes.

15 Q. And then the second one from
16 1928, Councilman Andres, reporting for the
17 street and road committee, said that
18 satisfactory results had been obtained by
19 using a residue furnished by the Warner
20 Chemical Company for filling holes and
21 building up the streets in low places.

22 Do you see that?

23 A. Yes.

24 Q. Do you know what the industrial
25 waste was that Warner Chemical Company

1 contributed to the streets?

2 A. No, I don't.

3 Q. Do you know whether or not it
4 contained any of the contaminants of concern?

5 A. No, I don't.

6 Q. And then it goes on in the '47
7 newspaper article that ash from pulverized
8 coal becomes molten slag which flows in a
9 continuous stream from the furnace bottom
10 and drops into water where it can -- okay.
11 That's not talking about the streets.

12 If you go to Bates 1155903. Are
13 you there?

14 A. Yes.

15 Q. Do you see the citation here,
16 these are notes in the Carteret Borough City
17 Council Meeting Minutes.

18 Do you understand that?

19 A. Yes.

20 Q. And the notes, for example, from
21 1903 indicate that the road committee
22 reported the need for 150 loads of ashes to
23 be used on crosswalks.

24 It's a little bit difficult
25 because it's handwritten, but do you see that?

1 A. Yes.

2 Q. And then in 1926 the street and
3 roads committee, Andres said ashes were
4 needed on Sharot Street and that they could
5 be had at the Warner Chemical Company now.

6 Do you see that?

7 A. Yes.

8 Q. And then if you go back to Bates
9 1155901, what the consultant did here is
10 that they looked at those meeting minutes
11 and highlighted the streets where the
12 streets and road committee identified the
13 use of fill materials to maintain the streets.

14 A. Yes.

15 Q. Do you understand that?

16 MR. GERMAN: Objection.

17 Q. And that indicates a relatively
18 broad application of ash, cinder and slag at
19 least in the AOC and the immediate transect
20 area; correct?

21 MR. GERMAN: Object. You're
22 mischaracterizing a document. You can
23 answer. Form, foundation.

24 A. It's hard to tell. The AOC
25 part, maybe. Transects, I don't know, maybe.

1 **Q.** If you had been provided the
2 underlying information with respect to the
3 PDF copies of the Carteret meeting minute
4 notebooks and all the other information that
5 was generated by this consultant, you could
6 have at least done some due diligence as to
7 the veracity of what the consultant is
8 saying in terms of the use of non-native
9 fill materials here; right?

10 **MR. GERMAN:** Objection.

11 **A.** Again, I would wait until there
12 was an expert report that had the opinions
13 laid out before I would comment.

14 **Q.** But this is enough information
15 combined with the copies of the meeting
16 minutes for you to at least evaluate the
17 claim; right?

18 **MR. GERMAN:** Objection.

19 **A.** No. I don't agree.

20 **Q.** What else would you need?

21 **A.** An expert report.

22 **Q.** And what specifically in that
23 expert report would be in the report that's
24 not present here and in the materials
25 supporting this diagram?

1 A. Well, I would think you would
2 agree that an expert report represents a
3 synthesis and I would have had time to look
4 at it as opposed to getting it this -- right
5 now and doing it, and the idea of having
6 time plus a synthesis, I could respond to it
7 better. I mean, everybody would do better
8 if they had a set of opinions, a rationale,
9 and the evidence all together and then were
10 asked to respond. You'd get a better
11 response as opposed to going through this
12 document and reading about where ash was put
13 on a certain -- you know, by Carteret or
14 whatever. The problem is I can't connect
15 these facts and I don't know if the facts
16 can be connected. That's the problem.
17 They're just facts.

18 Q. **Well, you understand that this**
19 **document contains a conclusion even if you**
20 **don't want to call it an opinion, it contains**
21 **a conclusion that non-native fill materials**
22 **were widely used in the construction of the**
23 **streets in Carteret; right?**

24 A. I don't dispute that fill was
25 used in Carteret.

1 **Q.** **Okay.**

2 A. I just say it's a secondary
3 contributor compared to the smelter, which
4 contributed over the entire class area.

5 **Q.** **Well, and, I mean, just relating**
6 **it back to the comment that we talked about**
7 **before where you said there was no**
8 **indication of widespread use of fill in**
9 **Carteret property --**

10 A. I'll tell you what you don't see
11 in this.

12 **Q.** **Can you answer my --**

13 A. You do not see the smelter. You
14 do not see an evaluation of the smelter as a
15 source. You see everything else, including
16 the kitchen sink as a source, but you do not
17 see it compared to the smelter.

18 **MR. SUTHERLAND:** Objection.

19 A. Now, presumably an expert
20 report, that analysis would be done.

21 **MR. SUTHERLAND:** Objection.
22 non responsive.

23 **Q.** **The -- I want to focus on your**
24 **statement in your report that there's no**
25 **indication of widespread use of fill in**

1 **Carteret proper.**

2 **Do you see that?**

3 A. Again, widespread use of fill.

4 What does widespread mean?

5 Q. **It's your report. You tell me.**

6 A. Widespread would mean Carteret's
7 built on an island made of fill.

8 Q. **Nothing less than that qualifies
9 as widespread in your mind?**

10 A. Not in my mind; no.

11 Q. **Okay.**

12 A. You know, a little ash on a
13 road, a little ash under a sidewalk, a
14 little ash in a low spot in the street, to
15 me that doesn't mean widespread use of ash.

16 Q. **You've testified in the past,
17 haven't you, Dr. Flowers, that cinders and
18 bottom ash from coal burning furnaces
19 contain arsenic; correct?**

20 A. Yes.

21 Q. **And they contain enough arsenic
22 to adversely impact the environment; correct?**

23 **MR. GERMAN:** Objection. You can
24 answer.

25 A. In large quantities, yes. Like

1 in a slag boiler ash pod. That's over a
2 thousand acres and the berms break and it
3 flows into a river. That's a pretty
4 negative impact.

5 **Q. Well, I mean, one of the**
6 **concerns in the Pennsylvania fly ash case**
7 **was the fact that the fly ash contained**
8 **metals; right?**

9 **A. Absolutely.**

10 **Q. And there was potentially enough**
11 **in those air emissions of fly ash from a**
12 **coal burning power plant that you**
13 **participated on behalf of the plaintiffs**
14 **that it needed to be cleaned up; right?**

15 **A. Yes. Because it was on a**
16 **property and in a house. But I would point**
17 **out it was air deposition.**

18 **MR. SUTHERLAND:** I seem to have
19 lost something.

20 **THE VIDEOGRAPHER:** Why don't we
21 close here.

22 **MR. SUTHERLAND:** Okay.

23 **THE VIDEOGRAPHER:** We are going
24 to go off at 2:14 and we'll end media 4.

25 Okay. We're off the record.

3 **THE VIDEOGRAPHER:** We're back on
4 the record at 2:23. This is media 5 in
5 the deposition of Dr. Flowers.

(Exhibit 558, microscopy
6 investigation by Newfields entitled AOC
7 Non-Native Residential Soil Excavation
8 at 76 Union St:PPIN2010, bearing Bates
9 No. USMR01074789(annotated), marked for
10 identification, as of this date.)
11

12 | CONTINUED BY MR. SUTHERLAND:

13 Q. Dr. Flowers, I'm showing you a
14 document that I marked as Exhibit 558. And
15 Exhibit 558 is a page that I just blew up
16 from Exhibit 549, that is the microscopy
17 investigation by Newfields.

18 A. Yes.

19 Q. And it is just one page that I
20 made bigger so we can see it a little bit
21 better. And Exhibit 558 is some photographs
22 of some microscopy and an aerial photograph
23 of one of the properties in the AOC, it's
24 PPIN2010 at 76 Union Street.

25 | Do you see that?

1 A. Yes.

2 Q. And I've inserted the Bates
3 number here although, you know, this
4 document has obviously been annotated since
5 the original. What I wanted to direct your
6 attention to was the soil profiles that you
7 can see on the left side of the page, sort
8 of the second column there.

9 A. Yes.

10 Q. And do you agree with me that
11 those soil profiles show lenses of material
12 that appear to be non-native?

13 A. Since I haven't really looked at
14 the native soil, I can't say for sure.

15 Q. Well, at least with respect to
16 the --

17 A. They look like they're layers
18 there, I would say that.

19 Q. Yes. If we look at the bottom
20 one, there's at least, you know, four,
21 perhaps even five distinct layers there;
22 correct?

23 A. There are different layers there
24 for sure.

25 Q. And there's at least four of

1 **them; right?**

2 A. Yeah.

3 Q. **And if we assume that black**
4 **layer that I've got the red oval around is**
5 **bottom ash or cinder, then that machine has**
6 **the potential to contain elevated levels of**
7 **arsenic; right?**

8 A. Maybe.

9 Q. **It's possible?**

10 A. Yeah. It's possible. It
11 depends where the ash came from.

12 Q. **And if we look at -- well, let**
13 **me ask a question about that.**

14 **You testified in your**
15 **Pennsylvania coal ash case -- no, no, you**
16 **testified in the Raritan Baykeeper case that**
17 **coal from Appalachia tends to have higher**
18 **levels of metals; correct?**

19 A. Higher levels of metals?

20 Q. **Yes.**

21 A. It does have metals in it and it
22 particularly reports to the boiler ash when
23 it's burned, that's where the highest
24 concentrations are, but some of it reports
25 to the fly ash.

1 Q. And those metals would include
2 arsenic; correct?

3 A. Yes.

4 Q. And they would include, to a
5 lesser extent, but they would also include
6 some lead?

7 A. Maybe, maybe not.

8 Q. And if we look in the third
9 column, the bottom picture, do you see that
10 layer that's visible that has the red circle
11 around it?

12 A. Yes.

13 Q. And you notice that that layer,
14 you would agree with me, it ends somewhere
15 sort of in the middle of the page; correct?
16 I mean the middle of the photograph.

17 A. I don't -- the one with a circle
18 around it seems to be toward the bottom of
19 the -- you mean the top part of it?

20 Q. Yeah. I'm just -- I'm just --
21 I'm referring to this photograph in the
22 third column on the bottom.

23 A. Oh, I'm on a different
24 photograph. That's what the problem is.

25 Q. Yeah. The third column, the

1 bottom photograph, it's got a little text
2 box that's got an arrow on it and it says
3 excavation under the driveway between the
4 two houses. The black cinder layer ends at
5 the property line.

6 Do you see that?

7 A. Yeah. I see what you're talking
8 about.

9 Q. And so we have, at least between
10 these two adjacent properties, we have
11 distinctly different positions at least at
12 this location as to the lithology of this
13 soil column at least in this area; right?

14 MR. GERMAN: Objection. You can
15 answer.

16 A. Well, I guess I would like to
17 have been there and, you know, if you look
18 at the diagram, it looks like the digging,
19 there may be material on top of that layer
20 to the right.

21 Q. Have you had an opportunity to
22 be present for any of the excavations in
23 Carteret?

24 A. No.

25 Q. Is that something that you had

1 **wanted to do?**

2 A. No. Not really. I haven't
3 wanted to do it. I didn't find it necessary
4 to be there.

5 Q. **Did you know that the excavation**
6 **at the named plaintiff, the Duartes,**
7 **happened this week?**

8 A. No, I didn't know that.

9 Q. **Would you have wanted to be**
10 **there if you could?**

11 A. For my opinion, it wasn't
12 necessary to be there on an individual
13 property.

14 Q. **It's not necessary to be there**
15 **to make an assessment of whether or not**
16 **non-native fill materials were present on**
17 **these residential properties?**

18 A. Well, I don't think from one
19 property you can make the conclusion that
20 it's on all properties, but, you know,
21 again, my conclusion was that air deposition
22 was the dominant mechanism, and I did say
23 that fill could be present on some properties.
24 May be contaminated, may not be contaminated,
25 but the overall pattern is consistent with

1 air deposition.

2 Q. But you would agree with me that
3 to answer the question of is there a fill on
4 the property and is that fill if it's
5 present contaminated, those are questions
6 that you have to go and look at the specific
7 property to answer; right?

8 MR. GERMAN: Objection.

9 A. I was not asked that question.

10 Q. But in order to answer those
11 questions, those are questions if we want to
12 know the answer for a particular property,
13 we have to go and look at the property
14 itself; right?

15 MR. GERMAN: Objection.

16 A. I was never asked to go to a
17 specific property. I wasn't tasked that.

18 Q. Can you answer my question in
19 terms of if you were asked that question and
20 if you needed to answer that question, you
21 would have to go to the property and
22 investigate it to determine if there was
23 fill present and if it was contaminated?

24 MR. GERMAN: Objection. Asked
25 and answered. You can answer.

1 A. I -- again, if that was the
2 task, say you called me up and said I want
3 you to go specifically to this parcel and I
4 want you to go and put down holes and tell
5 me what you find, I would have to go put
6 down holes and tell you what I found.

7 Q. **And the answers to the questions**
8 **that we've been talking about in terms of**
9 **whether there's fill present on that**
10 **property and whether that fill, if present,**
11 **was contaminated, the answer to those**
12 **questions as to that property don't tell you**
13 **anything about what the answer to those same**
14 **questions would be for the property next**
15 **door, do they?**

16 MR. GERMAN: Objection.

17 A. Not necessarily.

18 Q. **They do or they don't?**

19 A. They don't necessarily.

20 Q. **They don't tell --**

21 A. I don't know -- I don't have
22 data -- I don't have, you know, information,
23 I didn't look at that. I wasn't asked to do
24 that, look at it on a parcel by parcel basis.
25 I was asked to determine the dominant, you

1 know, transport mechanism for waste.

2 Q. If you could turn to Exhibit 547,
3 the Geosyntec deposition -- document. And
4 if you go almost to the back, go to Bates
5 USMR01074746.

6 Are you there?

7 A. I'm trying to get there.

8 Okay.

9 Q. And in this initial page, 746,
10 it describes terms that were used in the
11 lithology descriptions.

12 Do you understand that?

13 A. Yes.

14 Q. And these terms were chosen as
15 being indicative of non-native fill materials.

16 Do you understand that?

17 MR. GERMAN: Objection.

18 A. Yes.

19 Q. And then what Geosyntec did is
20 that they then searched for the individual
21 soil intervals and identified those that
22 included these lithology terms that are
23 associated with non-native material.

24 Do you see that?

25 A. Yes.

1 Q. And the results of that exercise
2 indicated that depending upon the soil
3 interval in the first four intervals, 31 to
4 39% of the samples had some sort of
5 indication of non-native fill material.

6 Do you see that?

7 A. That's what it says; yeah.

8 Q. And did you -- I think you
9 already told me, you didn't look at the
10 boring logs in connection with your
11 conclusion that there's no evidence of
12 extensive non-native fill materials; correct?

13 MR. GERMAN: Objection to the
14 form of the question. You can answer.

15 A. Again, it depends on what you
16 call the definition of extensive. They have
17 53,960 samples in the AOC. That's way more
18 than the number of analyses that are in the
19 AOC. So I don't know how that number
20 relates to the number of samples taken.

21 Q. But at least, according to this
22 table, for that top two feet, approximately
23 a third of the top two feet, approximately a
24 third of the samples have fill in them; right?

25 A. According to this, yeah.

1 **Q.** **You had access to the boring**
2 **logs, didn't you?**

3 **A.** We've gone over this. Yes, I --
4 no, I didn't. I never got the boring logs
5 and I didn't need the boring logs.

6 **Q.** **So you didn't ask for them?**

7 **A.** No.

8 **Q.** **One of the properties that you**
9 **identified by -- specifically was PPIN 7337**
10 **and I'm looking at page 18 of your report.**

11 **A.** Right.

12 **Q.** **And this was one of the transect**
13 **samples that had particularly high copper,**
14 **arsenic and lead concentrations; correct?**

15 **A.** Right.

16 **Q.** **But you didn't do any property**
17 **specific evaluation as to why those**
18 **concentrations were high; right?**

19 **A.** No, I didn't.

20 **Q.** **Did you ask if anybody else had**
21 **done an analysis of that type?**

22 **A.** No. My point in mentioning that
23 was to show that there was anomalous copper,
24 arsenic and lead removed from the smelter
25 site, and that was consistent with what I

1 had seen looking at all the data.

2 Q. Is it your opinion that the
3 copper, arsenic and lead that you report
4 there on page 18 more likely than not came
5 from the smelter?

6 A. Yes.

7 Q. All right. Let me have you go
8 back to Exhibit 547. And turn to Bates
9 USMR01074725.

10 Are you there?

11 A. Yes.

12 Q. And this initial page shows a
13 picture of the structure and cross-
14 references the address, 180 Pershing to the
15 PPIN 7337.

16 Do you see that?

17 A. Yes.

18 Q. And that matches up with the
19 sample ID that you have for sample 7337 on
20 page 18 of your report; correct?

21 A. Right.

22 Q. And if you flip the page to the
23 next page Bates USMR01074726, you will see a
24 Sandborn map of that same property from 1912.

25 Do you see that?

1 A. Yes.

2 Q. And backed up against that
3 property is a property that was used --
4 that's -- it's a Roosevelt Printing Shop.

5 Do you see that?

6 A. Yes.

7 Q. And there's a shed that's
8 immediately adjacent to the back property
9 line --

10 A. Right.

11 Q. -- of 7337; right?

12 A. (Witness nods head.)

13 Q. Is that correct?

14 A. Yes.

15 Q. And it's correct to say that
16 copper is a common component of printing
17 ink; right?

18 **MR. GERMAN:** Objection. You can
19 answer.

20 A. It's a component of printing
21 ink; yes.

22 Q. The cayenne that we talk about,
23 that's a copper cayenne compound that --

24 A. Right.

25 Q. -- gives that color its name;

1 right?

2 A. Right.

3 Q. And it's at least plausible that
4 while that property was being used as a
5 printing shop, that shed was used to store
6 printing ink; correct?

7 MR. GERMAN: Objection.

8 A. It's plausible.

9 Q. And it's plausible that that
10 shed could have been used to store used
11 solvents that were used to clean the
12 printing presses from the printing sledges;
13 correct?

14 MR. GERMAN: Objection.

15 A. It's possible.

16 Q. If we go to the next page of
17 Exhibit 547, that's USMR01074727, in the
18 late 1960s, that property tied into an auto
19 shop; right?

20 A. Yes.

21 Q. And copper is a common compound
22 for brake pads; right?

23 MR. GERMAN: Objection.

24 A. Yes.

25 (Exhibit 559, copy of boring

1 logs for PPIN 7337, marked for
2 identification, as of this date.)

3 Q. I'm handing you a document that
4 I've marked Exhibit 559. Exhibit 559 is a
5 copy of the boring logs for the property
6 we've been talking about, PPIN 7337 at
7 180 Pershing Avenue.

8 Do you understand that?

9 A. Yes.

10 Q. And if you look at the boring
11 log information for the various borings that
12 were done, many of them mention the presence
13 of cinders and coal within the boring;
14 correct?

15 A. Yes, they do.

16 Q. And cinders and coal would not
17 naturally be present in the soils of Carteret,
18 would they?

19 MR. GERMAN: Objection.

20 A. No, they wouldn't.

21 (Exhibit 560, location map for
22 where borings were taken on PPIN 7337,
23 marked for identification, as of this
24 date.)

25 Q. I'm handing you a document that

1 I've marked as Exhibit 560. Exhibit 560 is
2 a location map for where the borings were
3 taken on PPIN 7337.

4 Do you see that?

5 A. Yes.

6 Q. And let me go ahead and do this,
7 too.

8 (Exhibi5 561, copy of analytical
9 results for PPIN 7337, marked for
10 identification, as of this date.)

11 Q. I will hand you a map, a table
12 that I've marked as Exhibit 561, and Exhibit
13 561 is a copy of the analytical results for
14 PPIN 7337.

15 Do you see that?

16 A. Yes.

17 Q. And if we look at the highest
18 copper and lead and arsenic concentrations,
19 those are in sample numbers 1, 2 and 3; right?

20 MR. GERMAN: Objection.

21 A. No. I mean, are you --

22 Q. Well, okay, and then 9. 1, 2, 3
23 and 9.

24 MR. GERMAN: Objection.

25 A. I mean, are you throwing out the

1 X? That's the highest copper.

2 Q. Okay. All right. Well, okay.

3 So the highest copper, we got --

4 I did say 3; right? So the highest copper
5 is in boring 3; right? Because that's 6,550?

6 A. Maybe I'm -- yeah, yeah, that's
7 the highest copper.

8 Q. And then the second highest
9 copper is in boring 2; right? 1,710; right?

10 A. Yes.

11 Q. And if we look at our sample
12 map, that's borings 2 and 3, those are the
13 two borings that are closest to the shed
14 that was used by the printing press; right?

15 MR. GERMAN: Objection.

16 A. When you compare the maps, that's
17 true.

18 Q. Is it at least within the realm
19 of possibility that some of the copper that
20 was measured in borings 2 and 3 came from
21 spillage from copper inks and copper cleaning
22 materials from that printing press operation?

23 MR. GERMAN: Objection.

24 A. It's within the realm of
25 possibility, yeah. Can it be proved? No.

1 Q. Within -- if we look at boring
2 number 8 on Exhibit 561?

3 A. So when you say boring, what
4 identifier are you using?

5 Q. Oh, I'm sorry. I should have
6 helped you with that. If you look at the
7 sample ID number --

8 A. Yes.

9 Q. -- and then next to the sample
10 ID number it says use area.

11 A. Use area.

12 Q. The use area, the last, that's
13 the --

14 A. That's the boring?

15 Q. That's the boring number.

16 A. Okay.

17 Q. And then just to make it all
18 clear, those boring numbers then correspond
19 to the numbers on the map on page 560.

20 A. Okay. I get that. I just
21 didn't know where you were getting the
22 boring number --

23 Q. Yeah.

24 A. -- because there was no label.

25 Q. And the boring number is

1 actually repeated in the sample ID number,
2 it's the third field over.

3 A. Yes. I get it.

4 Q. I'm sorry. I should have done
5 that.

6 So if we look at boring number 8
7 on Exhibit 561, all of those values, both
8 for the zero to 6 and the 6 to 12 inch
9 intervals are low; right?

10 MR. GERMAN: Objection.

11 A. Lower; yeah.

12 Q. I mean, the lead values are even
13 lower than the 200 ppm that you've mentioned
14 based upon the Matteo Record of Decision?

15 A. Yes, they are.

16 Q. And the arsenic numbers are
17 below the cleanup level of 19?

18 A. That's true. The copper, that
19 68 is a little high.

20 Q. So you would agree with me that
21 at least between boring number 8 and borings
22 1, 2 and 3 that we talked about previously,
23 there's a wide disparity in the concentrations
24 on this one property; right?

25 MR. GERMAN: Objection.

1 A. There's variation on this
2 property and that's seen throughout the data
3 set.

4 Q. **And is it your opinion to a**
5 **reasonable degree of scientific certainty**
6 **that the variability that we see on PPIN 7337**
7 **in concentrations is consistent with the**
8 **conceptual site model based upon air**
9 **deposition?**

10 **MR. GERMAN:** Objection. You can
11 answer.

12 A. The -- that's a hard question to
13 answer. There's variability with depth and
14 you don't know -- if you look at a log, it's
15 hard to say at this degree of granularity
16 what part is air deposition, but it was in
17 close proximity to a smelter that was
18 raining material out of it, so I would say
19 that some of this represents smelter material.

20 Q. **How much of it is smelter**
21 **material?**

22 A. I don't know.

23 Q. **I think I understood you to say**
24 **that you did not do any individual property**
25 **analysis as part of the preparation of your**

1 opinions in this case; correct?

2 A. That's correct.

3 Q. And that includes any individual
4 property analysis of the named plaintiff's
5 property, that is the Duartes; correct?

6 A. That is correct.

7 Q. In your mind, would a visible
8 fill layer of combustion materials that's
9 two feet thick, would that be typical of a
10 residential property in this class?

11 **MR. GERMAN:** Objection.

12 A. I don't know if it's typical.

13 Q. Would visible remnants of a prior
14 building foundation and would construction
15 debris below the soil, would that be typical
16 of what you would expect to find in Carteret?

17 A. I don't know --

18 **MR. GERMAN:** Objection.

19 A. -- what typical means.

20 Q. And you don't have an opinion
21 about what's typical; correct?

22 **MR. GERMAN:** Objection.

23 A. I don't know what typical means.

24 Q. Okay.

25 A. See, I think you have to take

1 into consideration that while all this stuff
2 is going on in Carteret, filling, tearing
3 down buildings, doing whatever they're
4 doing, meanwhile the smelter is raining down
5 continuously contaminated material that gets
6 mixed in with all of this (indicating), and
7 so as long as the smelter is working, the
8 smelter is contributing.

9 **MR. SUTHERLAND:** Objection.

10 non responsive to everything after I
11 don't know what typical means.

12 **Q.** Dr. Flowers, did you have any
13 involvement in the sampling that was done by
14 the plaintiffs?

15 A. We've covered this and I said
16 that I did not go in the field.

17 **Q.** Did you talk to the contractor
18 who did the sampling?

19 A. No; except after the fact.

20 **Q.** And what discussions did you
21 have with him after the fact?

22 A. I asked him to provide me with
23 location diagrams for where the samples were
24 taken and coordinates for the sample locations.

25 **Q.** And did he provide you with a

1 **copy of his field notes?**

2 A. He provided me with drawings
3 showing the location of the building and
4 where the samples were taken and their
5 coordinates.

6 (Exhibit 562, document bearing
7 Bates Nos. Rosenfeld 000331-341, marked
8 for identification, as of this date.)

9 **Q. I'm handing you a document that**
10 **I've marked as Exhibit 562.**

11 **Is that a copy of the document**
12 **that he provided to you?**

13 A. One of them. This is the first
14 one, the first tranche.

15 **Q. And if you just flip through it,**
16 **is it -- there's a couple more after it.**

17 A. Oh, well, then if you've got
18 them all, then you're -- this is the type --
19 yeah, this is the information I was provided
20 with.

21 **Q. Okay.**

22 **Do you recall who it was that**
23 **you talked to?**

24 A. No, I don't, which is not
25 atypical for me.

1 Q. I just -- I want to ask you just
2 a couple of questions about these field notes.

3 Did you notice looking at, for
4 example, look at Bates Rosenfeld 0000337,
5 it's a hand -- one of the handwritten ones
6 about a little more than halfway back.

7 A. Okay.

8 Q. And the top property is
9 99 Randolph.

10 Do you see that?

11 A. Yes.

12 Q. And the plaintiff's contractor
13 noted that this particular set of samples,
14 there were coal fragments present between
15 zero and 1 foot; correct?

16 A. Yes.

17 Q. And then the sample below that,
18 the plaintiff's contractor indicated that
19 there was fill to 1 foot; correct?

20 A. Right.

21 Q. And then the third sample, there
22 is no fill, and then the fourth sample,
23 there was fill from zero to 1 feet coal frag;
24 correct?

25 A. Yes.

1 Q. Did you have any discussion with
2 the contractor for the plaintiff's sampling
3 about whether or not they saw evidence of
4 fill on a somewhat frequent basis?

5 MR. GERMAN: Objection.

6 A. No, I didn't.

7 Q. Have you physically looked at
8 any of the samples?

9 A. No.

10 Q. You said that you'd been to
11 Carteret before. When did you go to Carteret?

12 A. I visited Carteret in April.

13 Q. What was the purpose of your
14 visit?

15 A. I was asked by Mr. German to
16 connect up the on site geography with what
17 I'd been looking at maps so I understood
18 where the smelter was, where the houses were.

19 Q. So the primary purpose of your
20 visit was to get oriented in terms of the
21 location of the smelter versus the location --

22 A. Yes.

23 Q. -- of the whole class area?

24 A. Yes, I would say that's correct.

25 Q. You have to let me finish. I

1 know I'm slow sometimes, but --

2 A. Yeah. Well, that's what it was
3 for, is to put together, you know, when I
4 look at a map, I don't know what the place
5 looks like, so the idea was to go visit and
6 see what Carteret looked like.

7 (Exhibit 563, letter report by
8 Susan Litherland dated June 21, 2018,
9 bearing Bates Nos. USMR00855064-104,
10 marked for identification, as of this
11 date.)

12 Q. I'm handing you a document that
13 I've marked as 563.

14 Have you ever seen Exhibit 563
15 before?

16 A. No.

17 Q. Exhibit 563 is a letter report
18 of a property inspection that was done by
19 defendant's consultant, Susan Litherland.

20 Do you understand that?

21 A. That's what it says.

22 Q. And there was actually an
23 environmental consultant there for the
24 plaintiffs.

25 Did you ever see a report from a

1 plaintiff's expert related to this inspection
2 that took place in summer of last year?

3 A. No.

4 Q. Let me have you turn to -- let's
5 see -- let me have you turn to Bates
6 USMR00855074, and you can see there in
7 photo 9 the various sample locations that
8 the consultant sampled.

9 Do you see that?

10 A. Yes.

11 Q. And so, for example, there was a
12 sample of the dirt right below a deck and
13 then they actually took a sample of the wood
14 of the deck.

15 A. Okay.

16 Q. Do you see that?

17 And then if you, for example,
18 flip over to Bates USMR008558080, you'll see
19 some samples that were taken of -- in photo
20 5 there's a dock where we took a wood sample
21 of a garden, you know, timber, you know,
22 timber that people use to make flower beds
23 and the like.

24 Do you see that?

25 A. Right.

1 Q. And then we took a sample of the
2 fence and you can see in photo 8.

3 Do you see that?

4 A. Yes.

5 Q. And if we go back in the report
6 to the analytical report, and I'm looking at
7 page 855070, there's a table of the analytical
8 results.

9 A. 855070?

10 Q. Yeah. It looks like this.

11 A. Okay.

12 Q. And the various wood samples,
13 one of the wood samples, and you can see
14 this by the sample type, wood sample had
15 3,240 parts per million arsenic and 2,040
16 parts per million of copper; correct?

17 A. Yes.

18 Q. And then another wood sample had
19 1,960 parts per million arsenic and 626 parts
20 per million copper; right?

21 A. Right.

22 Q. And then the deck post that we
23 looked at, that obviously was made after
24 copper chromium arsenic treated wood was no
25 longer sold for residential purposes because

1 the arsenic is low, but the copper is still
2 high, 4,840; right?

3 A. Yes.

4 Q. And then some lattice that was
5 sampled that was treated still had the high
6 arsenic at 1,040; right?

7 A. Right.

8 Q. And you would agree with me
9 that, as you say, everything breaks down;
10 right?

11 A. Sure.

12 Q. And so some portion of this
13 arsenic and copper from these construction
14 materials as they break down in age, it's
15 going to end up in the soil; right?

16 MR. GERMAN: Objection.

17 A. Sure, it's possible it could end
18 up in the soil. It could be diluted out by
19 the soil, too, to some degree.

20 Q. Right, but, I mean, just -- I
21 mean, mass doesn't disappear.

22 A. No, it doesn't disappear, but
23 concentration varies depending on dilution
24 factor.

25 Q. Right. Right.

1 **MR. SUTHERLAND:** I need to take
2 a break and organize my materials to
3 see what else I have left.

4 **THE VIDEOGRAPHER:** Okay. We are
5 going to go off record 3:01.

6 (Whereupon, a brief recess was
7 taken.)

8 **THE VIDEOGRAPHER:** Back on the
9 record at 3:11.

10 **CONTINUED BY MR. SUTHERLAND:**

11 Q. Dr. Flowers, I just have a few
12 more questions.

13 If you could turn back to your
14 report, Exhibit 543, and under Summary of
15 Opinions in the first numbered paragraph,
16 you list a number of things that are lines
17 of evidence that you contend support your
18 conclusion that the class area was
19 contaminated with copper, arsenic and lead
20 from the USMR smelter.

21 Do you see that?

22 A. Yes.

23 Q. And I think we've talked about
24 most of these, but I want to make certain.
25 The first one is history of air pollution

1 violations.

2 **Do you see that?**

3 A. Yes.

4 Q. And you didn't make any effort
5 to quantify the emissions from those air
6 violations, did you?

7 A. No. I just made a note there
8 were a lot of violations for ambient lead in
9 the atmosphere.

10 Q. You noticed that there were
11 violations for ambient lead?

12 A. For ambient lead. That means
13 lead was getting into the atmosphere in
14 sufficient concentrations where you could
15 measure it in the air.

16 Q. Well, I thought you told me this
17 morning that you did not review the ambient
18 air monitoring data for lead concentrations?

19 A. I did not. I just made note of
20 the fact that there were violations.

21 Q. And it's your understanding that
22 there were actual violations of the Lead
23 National Ambient Air Quality Standards?

24 A. There were citations --

25 Q. And they were --

1 A. -- in some of the literature I
2 read.

3 Q. And it's your recollection that
4 those citations included citations for
5 violations of the Ambient Air Quality
6 Standards for lead?

7 A. I don't see how you get a
8 citation without a violation.

9 Q. Well, you know, I don't know
10 that you can either. I'm just trying to
11 make certain as you sit here right now your
12 recollection of the violations that you're
13 referencing are actually violations --

14 A. Right.

15 Q. -- of the National Ambient Air
16 Quality Standards.

17 A. I think they are.

18 Q. Okay.

19 A. I think they are.

20 Q. Okay.

21 And you did not do any kind of
22 quantification of how much lead those
23 violations may have contributed to particular
24 properties in the class; right?

25 A. No, I didn't.

1 Q. And then the fourth line of
2 evidence you have listed there is historical
3 aerial photographs showing plant emissions
4 blowing over Carteret.

5 Do you see that?

6 A. Yes.

7 Q. And sort of the same question,
8 you didn't do any quantitative type of
9 analysis of what the lead or particulate
10 impacts of those, what was depicted in those
11 photographs might be on the proposed class
12 area, did you?

13 A. No, I didn't.

14 Q. And then I will have you turn to
15 exhibit or Figure 27 of your report.

16 A. Okay.

17 Q. And Figure 27 is a figure that
18 was created by Mr. Sullivan; correct?

19 A. Yes.

20 Q. And I think you testified that
21 you were relying on Sullivan's air modeling
22 really from a qualitative standpoint of
23 here's what we would expect in terms of the
24 general distribution of airborne contaminants;
25 right?

1 A. Right. And I think that's the
2 main utility of air models.

3 Q. And if we look at modeling data
4 that Mr. Sullivan has reported, he shows a
5 number of I think they're referred to as
6 isopleths; right?

7 A. Yes.

8 Q. And those are those black lines,
9 and those indicate, according to Mr. Sullivan's
10 report, the contribution of lead to the soil
11 from the USMR facility; right?

12 A. From air deposition; yes.

13 Q. And if I understand your
14 testimony correctly, you're not really
15 putting a lot of stock in the actual numbers
16 themselves, but you are relying on sort of
17 the general shape of what those lines look
18 like?

19 A. Yes. Because to get a
20 concentration, he has to make a number of
21 assumptions like what is the volume of soil
22 the lead goes into, what's the density,
23 etc., and so -- and he only considers the
24 upper six inches, for example, and it's
25 clear that at least from the plaintiff's

1 sampling, the upper foot is impacted, we
2 don't know if it goes deeper than a foot,
3 but out on the periphery we do have
4 exceedances within the top foot.

5 Q. So if I understand the modeling
6 correctly, the model at least predicts that
7 along each one of those black lines, the air
8 deposition impact ought to be at least roughly
9 equivalent; correct?

10 MR. GERMAN: Objection. You can
11 answer.

12 A. Yes. Again, with the restriction
13 that there are assumptions built in to
14 drawing those lines. The better way to say
15 it would be that according to the model, the
16 dry deposition from the smelter is constant
17 along those lines and he converts that to an
18 equivalent concentration in the soil under a
19 set of assumptions.

20 Q. So if we look at, and I'm
21 particularly focused on the area between the
22 250 ppm line and the 200 ppm line. Do you
23 see that?

24 A. Yes.

25 Q. So if we look at the area

1 between those lines, the model would tell us
2 that the impact should be roughly equivalent
3 between those two lines; right?

4 A. It would be somewhere between
5 250 and 300.

6 Q. But if we look at Sullivan's
7 figure, he's posted the zero to six inch
8 soil lead concentrations for the properties
9 that were sampled between those two lines.

10 Do you see that?

11 A. Barely.

12 Q. And if you look at the far east
13 transect, there are a number of properties
14 with post plots that are orange and red;
15 correct? And those indicate lead
16 concentrations of over 600 parts per million;
17 correct?

18 A. Right.

19 Q. And then if we look along that
20 same interval and we go over to the far west
21 transect, all of the samples there are
22 either green or blue which indicates that
23 all concentrations are below 400 ppm.

24 Do you see that?

25 A. Yes, I see that.

1 Q. And have you done any evaluation
2 that explains why when the model predicts
3 equivalent concentrations, the actual data
4 shows a marked difference?

5 A. No; but my point was that the
6 model is qualitative, it's based on a set of
7 assumptions that are probably not easily
8 verifiable, and so the predictions in terms
9 of parts per million I take with a grain of
10 salt.

11 Q. Well, I'm not really asking you
12 about predictions in terms of parts per
13 million, what I'm really asking you is
14 predictions with respect to equivalents,
15 because these isopleths suggest that there
16 would be an equivalent impact between these
17 two sets of properties; isn't that right?

18 MR. GERMAN: Objection.

19 A. That's what it predicts based on
20 deposition, not anything that might have
21 happened after deposition and this is an
22 integrated picture of a full scenario.

23 Q. And you would at least agree
24 with me that the post plot of the soil data
25 suggests that those impacts between the

1 **western transect and eastern transect are**
2 **not equivalent, are they?**

3 A. Oh, that's what the graph shows;
4 yes. I would agree with that.

5 Q. **Okay.**

6 **MR. SUTHERLAND:** Pass the witness.

7 **MR. GERMAN:** I need like five
8 minutes just to look through my notes.

9 **MR. SUTHERLAND:** Okay.

10 **THE VIDEOGRAPHER:** All right.

11 We'll go off the record at 3:20.

12 (Whereupon, a brief recess was
13 taken.)

14 **THE VIDEOGRAPHER:** Back on the
15 record 3:34.

16 **EXAMINATION BY**

17 **MR. GERMAN:**

18 Q. Dr. Flowers, I just want to ask
19 you hopefully a few questions to clarify
20 some issues that I had with your testimony
21 today, make sure I understand it, and I want
22 to begin with the series of questions we just
23 left off with concerning the Dr. Sullivan's
24 air model, which is exhibit -- which is
25 Figure 27 in your report, which is Exhibit 543.

1 Do you have that?

2 A. Yes.

3 Q. And Mr. Sutherland asked you
4 some questions about what this model is
5 predicting.

6 Do you know those questions?

7 A. Yes.

8 Q. And one of the last questions he
9 asked you is whether this model predicts
10 that properties in the northeast along the
11 iso-concentration lines would receive
12 smelter impacts that are different, for
13 instance, from properties in the far west.

14 Do you remember a question like
15 that?

16 A. Yes.

17 **MR. SUTHERLAND:** Object to the
18 form.

19 Q. And I think your testimony was,
20 according to what's predicted here, which
21 you take with a grain of salt, this model
22 would predict that the impacts in the
23 northeast, for instance, would be different
24 from -- would be numerically different to
25 some extent from impacts in the west.

1 **Is that what you said in your**
2 **testimony or --**

3 **MR. SUTHERLAND:** Object to --

4 **Q.** -- did I misunderstand that?

5 **MR. SUTHERLAND:** Objection to
6 form.

7 A. That's what I see in the diagram.

8 **Q.** Okay. I have a slightly
9 different question.

10 Does this model, Figure 27 from
11 Dr. Sullivan, tell you anything in a broader
12 sense about impacts from the smelter in the
13 proposed class area?

14 A. The fact that the isopleths
15 extend outward to the New Jersey Turnpike
16 tells me that the entire class area was
17 impacted by smelter operations.

18 **Q.** And that's true despite some
19 variations in these contour lines; is that
20 accurate?

21 A. Yes.

22 **Q.** Okay.

23 Now, this area of impact from
24 the smelter, is that what you depicted in
25 Figure 28?

1 A. In Figure 28, this is a figure
2 showing the proposed class area is considered
3 with the area impacted, and in my opinion
4 the impact probably goes beyond the proposed
5 class area, but it does impact the entire
6 class area.

7 Q. Okay.

8 And would it be accurate to say
9 that all of the properties in this proposed
10 class area on Figure 28 share the common
11 trait that they've been impacted by that
12 source, the USMR smelter?

13 A. Yes.

14 **MR. SUTHERLAND:** Object to the
15 form.

16 Q. And would a property in the
17 northeast of the proposed class area be
18 similarly situated as a property in the
19 southwest vis-à-vis its impacts from the
20 smelter?

21 **MR. SUTHERLAND:** Object to the
22 form.

23 A. It would be impacted regardless
24 of where it is in the class area.

25 Q. And when you say impacted, are

1 those significant impacts? How would you
2 describe those impacts?

3 **MR. SUTHERLAND:** Object to the
4 form.

5 A. Yes, I would -- I would describe
6 them as significant impacts from air
7 deposition.

8 Q. **From the smelter?**

9 A. From the smelter.

10 Q. **Now, I want to turn your
11 attention to Exhibit 561.**

12 A. Is that my report?

13 Q. **No. It's this table, this Excel
14 file.**

15 A. Okay.

16 Q. **Concerning PPIN 7337.**

17 A. Okay.

18 Q. **And --**

19 A. Is this it?

20 Q. **Yes.**

21 A. Okay.

22 Q. **561?**

23 A. Yeah.

24 Q. **And Mr. Sutherland asked you a
25 series of questions about this.**

1 Do you recall some of those
2 questions?

3 A. Yes.

4 Q. And one of the questions or a
5 series of the questions related to sampling
6 boring number 08.

7 Do you remember that?

8 A. Yes.

9 Q. And I'm going to paraphrase this
10 testimony and you can correct me if I
11 misunderstood it or I'm sure he will object,
12 but I recall you being asked something along
13 the lines of as you look at boring 8, can
14 you tell us how much of what we're seeing in
15 the boring 8 sampling results came from the
16 smelter.

17 Do you remember that question?

18 A. Yes, I do.

19 Q. Okay.

20 And do you remember what your
21 answer was?

22 MR. SUTHERLAND: We're talking
23 about boring 8?

24 MR. GERMAN: Boring 8.

25 Q. I think you asked -- your answer

1 **was I can't tell for boring 8 how much of**
2 **this came from the smelter. Do you remember**
3 **saying that?**

4 A. Not quantitatively.

5 Q. **Okay.**

6 A. But it has the signature of the
7 smelter in the sense that arsenic, copper
8 and lead show the sympathetic relationship
9 that I cite in my report. Even the low
10 values like the sample with 68.6, that's an
11 elevated copper, it has an elevated lead and
12 not so much an elevated arsenic. The only
13 sample in there that is really atypical is
14 the lowest one, which has the low copper.

15 Q. **And if I asked you to look at**
16 **the bigger data set of 7337, all of the**
17 **sampling results --**

18 A. Okay.

19 Q. **-- could you then tell us how**
20 **much of that comes from the smelter?**

21 A. I could tell you whether the
22 majority of it came from the smelter or not.
23 One of the things I would do is I'd take all
24 the data and I'd run the Spearman coefficient
25 on all of the data from this boring and I'd

1 see how big it was.

2 Q. And sitting here now, as you
3 look at this data and having done what
4 you've done in this case, can you tell us
5 how much comes from the smelter?

6 A. The majority. Mainly because of
7 the elevated copper throughout the core.

8 Q. Throughout the day today you
9 were shown certain exhibits, including, for
10 instance, 547, which is the Geosyntec
11 PowerPoint, which contains some chemical
12 fingerprint analyses and variograms, you
13 were shown the Newfields forensic microscopy
14 investigation, which is 549, and you were
15 shown Exhibit 548, which is the FTI overview
16 of alternate sources of copper, lead and
17 arsenic.

18 Do you remember discussions
19 surrounding those three documents?

20 A. Yes.

21 Q. And we spoke about Paris Green
22 and we spoke about leaded paint and we spoke
23 about all sorts of other potential sources
24 of contamination or theoretical or hypothetical
25 sources of contamination in Carteret.

1 A. Yes.

2 Q. Did you -- having seen all this
3 today, are you comfortable that you've seen
4 the information you need to see to render
5 the opinions you've been asked to render to
6 date?

7 A. Well, I rendered the opinions
8 before I saw any of that, and as a result I
9 must be confident in my opinions, so I don't
10 think I needed that material to render the
11 opinions I rendered.

12 Q. And do you feel that you've
13 conducted all of the analysis you need to
14 conduct to render the opinions you've
15 rendered to date?

16 A. Yes.

17 **MR. GERMAN:** I have no other
18 questions.

19 **MR. SUTHERLAND:** Just a few
20 follow-ups.

21 CONTINUED EXAMINATION

22 BY MR. SUTHERLAND:

23 Q. Dr. Flowers, you were asked a
24 number of questions sort of what you said in
25 response to my questions about Figure 27 of

1 your report and then what you said in
2 response to my questions with respect to
3 Exhibit 561. None of the answers that you
4 gave me, you know, 30 minutes to an hour
5 ago, you don't feel the need to amend any of
6 those answers, do you?

7 A. To your questions?

8 Q. **Yes.**

9 A. I don't think that -- so your
10 questions were very focused on specific
11 details here. The only amendment I would
12 offer is that there is a significant impact,
13 the chemical data here is consistent with
14 significant impact from the smelter.

15 Q. **Okay.**

16 A. Regardless of whatever else is
17 in there.

18 Q. **Right.**

19 **But in getting into the details**
20 **that we discussed with the individual borings**
21 **and the like, you don't feel a need to amend**
22 **any of those answers, do you?**

23 A. I would -- not really. I don't
24 think they bear on my report. They weren't
25 required for my conclusions and they don't --

1 I don't believe they affect my conclusions.

2 Q. Okay. Fair enough.

3 And the same thing is true with
4 respect to the discussion that we had about
5 Figure 27 and how to interpret the various
6 isopleths versus the post plot data for the
7 soil samples on Figure 27 of your report,
8 you don't need to amend any of your answers,
9 do you?

10 A. You asked me what I saw in the
11 picture and what's in the picture is in the
12 picture.

13 Q. Okay. Fair enough.

14 On Figure 28, that's the proposed
15 class area; correct?

16 A. Yes.

17 Q. Did you have any involvement in
18 setting the geographic boundaries of the
19 proposed class area?

20 MR. GERMAN: Object to form.

21 You can answer.

22 A. No.

23 Q. And when you received the
24 assignment that you did in this case, you
25 were given that proposed class area as part

1 of your assignment; right?

2 A. Yes, I was --

3 **MR. GERMAN:** Objection to form.

4 A. -- given the Complaint and the
5 class area was in the Complaint.

6 Q. **There were a few questions that**
7 **Mr. German asked you about where you used**
8 **the word impacts.**

9 **Do you recall that?**

10 A. Yes.

11 Q. **And in the context of those**
12 **answers where you used that term impacts,**
13 **you were not attempting and you have not**
14 **indeed done any kind of quantitative**
15 **analysis of the impact of the historical air**
16 **emissions from the smelter on particular**
17 **properties within the class; right?**

18 A. Not on particular properties.

19 Just the class area as a whole.

20 Q. **And even with respect to the**
21 **class area as a whole, when you described**
22 **there being significant impacts across the**
23 **class, have you done any sort of putting a**
24 **number to that for the class area?**

25 **MR. GERMAN:** Objection to form.

1 A. I would say that the majority of
2 the elevations that we see in the soil are
3 due to the smelter.

4 Q. **But in terms of the actual, hey,**
5 **it was --**

6 A. 12% or --

7 Q. **12% --**

8 A. -- 13?

9 Q. **-- or 30%.**

10 A. No, I haven't done that.

11 **MR. SUTHERLAND:** Pass the
12 witness.

13 **MR. GERMAN:** One last question.

14 CONTINUED EXAMINATION

15 **BY MR. GERMAN:**

16 Q. **Dr. Flowers, if you were to**
17 **define the class area, if you were asked to**
18 **define the class area, based on an area with**
19 **significant impacts from the smelter, would**
20 **it extend beyond the boundaries in Figure 28?**

21 A. Yes, I would expect that it would.

22 **MR. GERMAN:** No other questions.

23 **MR. SUTHERLAND:** We're done.

24 **MR. GERMAN:** All right. That
25 will conclude this deposition at 3:48

1 and end media 5.

2 **THE REPORTER:** Can you please
3 just tell me if you want the witness to
4 read and sign or if you waive?

5 **MR. GERMAN:** Read and sign.

6 **THE WITNESS:** I would like to
7 read and sign.

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1 A C K N O W L E D G E M E N T
2

3 I, GEORGE C. FLOWERS, Ph.D.,
4 hereby certify that I have read the
5 transcript of my testimony taken under
6 oath in my deposition of June 14, 2019;
7 that the transcript is a true, complete
8 and correct record of what was asked,
9 answered and said during this
10 deposition, and that the answers on the
11 record as given by me are true and
12 correct.

13

14

15

GEORGE C. FLOWERS, Ph.D.

16

17

Subscribed and sworn to

18

before me this ____ day

19

of _____, 2019.

20

21

NOTARY PUBLIC

22

23

24

25

1 C E R T I F I C A T E

2 STATE OF NEW YORK)

3) ass.:

4 COUNTY OF NASSAU)

5 I, ROBIN LaFEMINA, a Registered
6 Professional Reporter, Certified LiveNote
7 Reporter and Notary Public within and for
8 the State of New York, do hereby certify:

9 That GEORGE C. FLOWERS, Ph.D.,
10 the witness whose deposition is hereinbefore
11 set forth, was duly sworn by me and that such
12 deposition is a true record of the testimony
13 given by such witness.

14 I further certify that I am not
15 related to any of the parties to this action
16 by blood or marriage; and that I am in no
17 way interested in the outcome of this matter.

18 IN WITNESS WHEREOF, I have
19 hereunto set my hand this 20th day of June,
20 2019.

21
22 ROBIN LaFEMINA

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